SEPTEMBER/OCTOBER 2015

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SEPTEMBER/OCTOBER 2015

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This issue's cover features Canon's EOS 5Ds which is the first 'full-35mm' format D-SLR to break through the 50 megapixels barrier. This ultra-high resolution demands a more disciplined approach to your camera, but rewards your with a superlative imaging performance. Our comprehensive test report starts on page 32.

Camera magazine is a member of the Technical Image Press Association. Visit **www.tipa.com**

Box Tops

BACK WHEN I STARTED OUT road-testing camera gear (no, you don't need to ask), in one particular review I wrote something about the packaging. The editor of the day, wielding the red pen (literally back then), told me in no uncertain terms that such details were an irrelevancy, and I would do better to concentrate more on the main topic. Yes, boss.

I've never mentioned packaging in a review again, but I've always inwardly commended any manufacturer who quite clearly went to a bit of effort in this department. Of course, I've been fortunate enough to unbox quite a few cameras along the way and – call me strange – I never tire of the thrill, especially if the test sample happens to be brand-spanking new and I'm the first to use it. It's true that in the past the box was pretty much just a container to hold everything in, and in the bad old days it was basically just a light card wrapper around a nasty lump of polystyrene.

But things have changed. Apart from the environmental considerations which have seen the polystyrene replaced by some ingenious origami with paper-based products to keep everything in place, there's an emphasis on both style and design. Apple probably started it – those crisp white boxes are elegantly simple and oh-so-cool – and quite a few camera makers have followed suit, creating packaging that not only looks wonderful, but incorporates many clever design elements. So now – as evidenced by numerous U-Tube videos – unboxing a new camera, especially a higher-end model, is something of an occasion. It helps that there's quite a few more components to include compared to the film days, but camera packaging has become a lot more than just a box.

As in many other categories of consumer products, it's designed to make a statement. On the surface level – most notably with the styling – it commends you on your choice of brand and model, and reassures you that you've made the right decision. After all, it's saying subliminally, just how good is your taste in cameras? Then, as you begin unpacking, the experiential element promises that exciting and rewarding times with your new purchase lie ahead. If you're having this much fun even before you switch on the camera, just imagine how fulfilling ownership of this beautifully packaged object is going to be.

So we're not just talking about the physical packaging here, but what it suggests beyond the paper and printing… which is, we think this product is important enough to wrap it up with all this care and attention because you, as the purchaser, are important to us too.

Not surprisingly, I'm now a bit of an expert on this subject, so I feel well qualified to commend a number of brands on their packaging… in particular, Fujifilm (for the X Series), Sony (notably for the Alpha 7 models) and Olympus (for OM-D). Even the entry-level OM-D E-M10 gets the five-star treatment with its boxing, and the deliciously understated but sharply smart styling is all part of the hugely appealing image Olympus has fashioned for its OM-inspired mirrorless cameras.

But the pick of the packers has to be Leica. Elsewhere in this issue you can read our review of the new Leica Q full-35mm sensor fixed-lens camera where I've steadfastly resisted the temptation to mention the packaging, but I'm going to let loose here. The outer carton is finished in the house style of silver with a black insert in which is a keyline rendition of what lies within. Open the lid, and the sides splay out like the petals of a blossoming flower to reveal a black inner carton. There are two front flaps secured with magnetic latches. Opening these reveals what looks like a mini set of drawers. The camera itself sits in a handsome box at the top – which continues the silver and black colour scheme – while below is a shallow drawer (complete with a cord-type handle) which contains the instruction manual and various other documentation, including a little brochure rather excitingly titled "Your benefits as a Leica customer" (owning a new Leica camera is presumably one of them). A second, deeper drawer contains all the accessories and, inside, everything has its own little fabric drawstring bag… in black, of course, and emblazoned with the classic Leica logo in silver.

It's all quite lovely, and while you wouldn't expect something costing just shy of $6000 to come in a recycled plastic shopping bag, it's the attention to the little details that make this ensemble something truly special. Oh, and the camera is pretty good too.

Paul Burrows, Editor

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SEPTEMBER/OCTOBER 2015

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EPSON UNVEILS NEXT-GEN A2+ PRINTER

FOLLOWING THE INTRODUCTION of the first SureColor series photo printer – the A3+ format SC-P600 – a few months ago, Epson has launched its A2+ sibling.

Similarly styled, the SureColor SC-P800 A2+ replaces the popular Stylus Pro 3880 in Epson's line-up of pro-level pigmented-ink printers and uses the same MicroPiezo print head and advanced LUT technology for high resolution imaging at up to 2880x1140 dpi. The P800 uses Epson's latest Ultrachrome HD inkset – introduced with the SC-P600 – with nine colours, but in larger, 80 millilitre cartridges. The new inks provide a large colour gamut with, Epson claims, the highest Dmax in the market, enabling improved results with both colour and black and white printing. The new inks also provide improved lightfastness.

Like the SC-P600, the P800 has a 6.8 cm colour LCD control panel with touch controls. It has a large multi-sheet rear tray as well as a new front paper path for fine-art media. An optional poll paper unit can be fitted, providing support for rolls in widths from 13-inches to 17-inches. This makes it possible to produce long panoramic prints and use a wide range of speciality media stocks

Additionally, the SC-P800 supports WiFi connectivity, Cloud Print services and ships with an extensive software suite, including upgraded ColorBase2 which enables simple and fast colour calibration using a range of common spectrometers. Also included is the new Epson Print Layout software which works in conjunction with photo editing software such as Adobe Photoshop, Lightroom and Nikon ViewNX-i to enable flexible outputs suiting a wide variety of print and display requirements.

Graphics and images can be formatted for printing either as a single image or as a compound image using a range of pre-designed templates and or custom settings. Colour can be adjusted to suit different presentation styles and there is an 'Advanced B&W' mode. The SC-P800 also provides soft proofing functionality, supports custom media registration and incorporates a Gallery Wrap mode with a range of edge settings to suit images that need to be frame mounted.

The SureColor SC-P800 is available now priced at $1295. For more information visit **www.epson.com.au**

BRIEF EXPOSURES

Canon has produced its 110-millionth EF mount lens, setting a new world record for the most interchangeable camera lenses produced ever. This milestone was reached with the production of an EF 11-24mm f4.0L USM wide-angle zoom. The EF mount (with the EOS camera system) was launched in 1987, and the lens line-up has grown to a total of 97 models, including the EF Cinema Lenses for digital cinematography. **For more information about Canon EF lenses visit www.canon.com.au**

Meanwhile, over at **Nikon**, they're celebrating the building of 95 million Nikkor lenses since the legendary Nikon F was launched in 1959. The two rivals used to be neck-and-neck in the lens production numbers race, but Canon seems to have pulled ahead over the last year or so. Of course, Nikon's count started earlier too, although it's really from the autofocus era onwards that both manufacturers' numbers really started to accelerate. There have been quite a few new lens announcements from Nikon recently so the company no doubt has its eye on the magic 100 million units milestone. **For more information about Nikkor lenses visit www.mynikonlife.com.au**

Adobe has introduced Camera Raw Version 9.1.1 which provides support for a number of recently released camera models including the Leica Q, Panasonic Lumix GX8, Sony A7R II, Pentax K-3 II (specifically for its pixel shift resolution mode) and Phase One's new IQ3 series of digital capture backs. Importantly, Adobe has stated this will be the last ACR update available for CS6 users so they'll either have to switch to the Cloud-based subscription software or use the DNG converter to handle the RAW files from any subsequent new camera models (but which doesn't include lenses). **For more information visit www.adobe.com**

BEHIND EVERY POWERFUL IMAGE IS A POWERFUL STORY

The Canon Light Awards is a programme of challenges created and judged by photographers. Be inspired, challenge yourself, improve your skills and become better storytellers through photography. Winners receive feedback from our Masters, plus there are over $150,000 in prizes to be won. See the latest brief and submit your entry at **www.canon.com.au/lightawards**

Photo: Darren Jew, Canon Master

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NIKON GETS BUSY WITH NEW LENSES

PART 1

Both the new AF-S Nikkor 500mm f4.0 and 600mm f4.0 supertelephotos are more compact and lighter than their predecessors. Upgraded 'VR' optical image stabilisation gives up to four stops of correction for camera shake.

LEVERAGING THE LATEST in lens technologies, Nikon has introduced a pair of new prime supertelephoto lenses which are significantly lighter than the preceding models. The AF-S Nikkor 500mm f4.0E FL ED VR weighs in at 3.09 kilograms while the new AF-S Nikkor 600mm f4.0E FL ED VR tips the scale at 3.81 kilograms (a massive reduction of 1.45 kilos). These are 'FX' format lenses for Nikon's D-SLRs with full-35mm size sensors, but can also be used on the 'DX' models with 'APS-C' sizes sensors (with a 1.5x increase in the effective focal length).

The 500mm has a 16-element optical construction of which three are made for the latter designed to work with rapid panning and autofocus tracking. The new 500mm has a minimum focusing distance of 3.6 meters while the 600mm's is 4.4 metres. Both models have a nine-blade electromagnetically-controlled diaphragm for more consistent frame-to-frame exposures during high-speed continuous shooting. Both lenses have magnesium alloy barrel tubes with a built-in tripod mount collar.

New 'DX' format AF-S Nikkor 16-80mm f2.8-4.0 zoom lens is equivalent to 24-120mm and weighs in at just 480 grams.

'Super ED' (super extra-low dispersion) glass and two are fluorite types to optimise the correction for chromatic aberrations (while also contributing to the weight reduction). The 600mm's optical construction also includes two fluorite elements and four made from 'Super ED' glass. Both models have Nikon's 'Nano Crystal' multi-coating to minimise flare and ghosting, plus a fluorine coating applied to the meniscus protective glass at the front of the lens to protect against dirt, moisture and grease.

The 'Vibration Reduction' (VR) optical image stabilisation in each lens is claimed to give up to four stops of correction for camera shake, and has the choice of 'Normal' and 'Sport' modes…

Also new from Nikon is a 'DX' format 16-80mm f2.8-4.0 zoom lens (equivalent to 24-120mm) which weighs in at just 480 grams. This lens has a 17-element optical construction which includes four 'ED' glass types (extra-low dispersion) and three aspherical. It also features Nikon's 'Nano Crystal' anti-reflection coatings and VR optical image stabilisation which is claimed to give up to four stops of shake correction.

The VR systems has automatic detection of when the camera is on a tripod, switching to single-axis correction. The minimum focusing distance is 35 centimetres and autofocusing is performed via Nikon's 'Silent Wave Motor' ultrasonic drive system.

All three new AF-S Nikkor lenses are available locally now, but as usual there is no indication of local pricing. As a guide, the US prices are (SRP) US$1070 for the DX 16-80mm zoom, US$10,300 for the 500mm f4.0 and US$12,300 for the 600mm f4.0. For more information visit **www.mynikonlife.com.au**

The 50 Most Significant Cameras… Less One

Many thanks to you sharp-eyed readers who noted the Minolta mix-up in our feature 'The 50 Most Significant Cameras Of All Time' published in the last issue. The number 45 entry – the Minolta Hi-Matic 7 – was erroneously accompanied by an illustration of the Minolta 7000. In fact, we had great problems sourcing a copyright-free image of the Hi-Matic 7 which is why the mistake eventually occurred. Here, just to complete the feature, is a period advertisement for the Hi-Matic 7… feel free to cut-and-paste. We particularly enjoyed the observation of one reader who felt the mistake was compounded because of the awfulness of the 7000's styling versus the simple elegance of the Hi-Matic 7. We agree.

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NIKON GETS BUSY WITH NEW LENSES

PART 2

AF-S Nikkor 200-500mm f5.6E ED VR.

IF YOU OWN one of Nikon's 'FX' format D-SLRs with a full-35mm size sensor, there are three new AF-S Nikkor lenses to consider adding to your system.

The AF-S type lenses have built-in autofocusing drives – Nikon's ultrasonic 'Silent Wave Motor' – and there's a continuous program to eventually upgrade all contemporary Nikkor lenses to this spec as well as adding features such as optical image stabilisation. The entry-level 'DX' format Nikon D-SLRs no longer have body-based AF drives and Nikon could be planning to go this way with its lower-priced 'FX' models. Additionally, it's a certainty that the much-rumoured Nikon full-35mm format mirrorless camera won't have a built-in AF motor. As an aside, we have a feeling this camera will break cover in early 2016.

The new arrivals are the AF-S Nikkor 24-70mm f2.8E ED VR, AF-S Nikkor 200-500mm f5.6E ED VR and the AF-S Nikkor 24mm f1.8G ED. The new 24-70mm f2.8 is the first AF-S Nikkor lens to incorporate an aspherical extra-low dispersion (ASP/ED) glass element which corrects for both distortion and chromatic aberrations. The 20-element optical construction also includes three conventional aspherical and two ED glass types plus one High Refractive Index (HRI) element.

Compared to its predecessor, this lens also has Nikon's 'Vibration Reduction' (VR) image stabilisation – claimed to give up to four stops of correction for camera shake – an electromagnetic diaphragm control which gives more consistent exposure accuracy across burst sequences, and Nikon's 'Nano Crystal Coat' anti-reflection coatings. The SWM drive is claimed to be 1.5 times faster than before. Like the previous model, the barrel is sealed against the intrusion of dust and moisture, but the new lens also has fluorine coatings on the front and rear elements to help repel water and dirt. Nikon says the durability of the physical construction has been increased. The new 24-70mm f2.8 has a nine-bladed diaphragm and an 82 mm diameter screwthread filter fitting (up from 77 mm previously).

left:AF-S Nikkor 24-70mm f2.8E ED VR.
right:AF-S Nikkor 24mm f1.8G.

The 200-500mm f5.6E ED VR is an all-new model employing a 19-element optical construction which includes three ED glass types to minimise chromatic aberrations. It incorporates the VR optical image stabilisation which is claimed to give up to 4.5 stops of correction for camera shake. As it weighs in at a reasonably manageable 2.3 kilograms, it's feasible to consider using this lens hand-held, although it incorporates a tripod mounting bracket (which is detachable). It also has electromagnetic aperture control, a nine-bladed diaphragm and a 95 mm diameter screwthread filter fitting.

The 24mm f1.8G ED joins Nikon's growing family of f1.8 prime lenses for the 'FX' format bodies which combine speed with affordability and comparatively compact dimensions, including 20mm, 35mm and 50mm models. The new 24mm weighs in at 355 grams and has a 12-element optical construction which includes two ED types and two aspherical types. This lens also has the 'Nano Crystal Coat' anti-reflection coating. The minimum focusing distance is 23 centimetres.

Again, there's no indication of local pricing so, as a guide here are the US (SRP) prices which are US$2400 for the 24-70mm, US$1400 for the 200-500mm and US$750 for the 24mm f1.8. However, remember that the Australian dollar is fluctuating quite wildly against the US currency at present so be prepared for some variations when doing your own price checking. For more information visit www.mynikonlife.com.au

PHOTOGRAPHY EXHIBITIONS & EVENTS

Current to 4 October: Exhibition. ***Remain In Light: Photography From The MCA Collections.*** Over 70 artworks by Australian and international artists collected by the University of Sydney and the Museum of Contemporary Art during a period spanning more than 50 years. Touring exhibition on at the Maitland Regional Art Gallery until 1 February. Bendigo Art Gallery from 21 February to 19 April. Artspace Mackay from 22 May to 4 July. Hawkesbury Regional Gallery from 7 August to 4 October.

Current to 5 October: Exhibition. ***Wildlife Photographer Of The Year.*** A total of 100 images from the world's largest wildlife and natural history photo competition. At the Australian Museum, 6 College Street, Sydney, NSW 2010. Museum hours are 9.30am to 5.00pm daily. For more information visit www.australianmuseum.net.au

Current to 11 October: Exhibition. ***The Photograph And Australia.*** Comprising 350 photographs from over 35 lenders, this major exhibition reflects an evolving image of Australia from the 1840s onwards. At the Queensland Art Gallery, Stanley Place, Cultural Precinct, South Bank, Brisbane, Queensland 4101. Telephone (07) 3840 7303 or please visit www.qagoma.qld.gov.au for more information. Gallery hours are 10.00am to 5.00pm daily.

Current to 25 October: Exhibition. ***Julia Margaret Cameron: From The Victoria & Albert Museum.*** Marking the 200th anniversary of the birth of the famous British portrait photographer with prints on loan from London's V&A. At the Art Gallery of NSW, Art Gallery Road, The Domain, NSW 2000. Telephone (02) 9225 1744 for more information or visit www.artgallery.nsw.gov.au Gallery hours are 10.00am to 5.00pm daily (open to 9.00pm on Wednesdays).

16 – 18 October: The Digital Show 2015. All the latest imaging products and processes on show. Organised by the Image & Digital Entertainment Association (IDEA) Australia. At the Melbourne Convention & Exhibition Centre, Southbank, Melbourne, Victoria 3006. Visit www.thedigitalshow.com.au for more information.

20 November – 13 March 2016: Exhibition. ***Bailey's Stardust.*** A retrospective exhibition of photographs from London's National Portrait Gallery covering the long career of legendary fashion photographer David Bailey. At the National Portrait Gallery (NPG), King Edward Terrace, Parkes, ACT 2600. Gallery hours are 10.00am to 5.00pm daily. For more information telephone (02) 6102 7000 or visit www.portrait.gov.au

20 – 25 September 2016: 2016 Photokina World Of Imaging. The world's largest exhibition of new imaging products and processes. At the Köln Messe, Cologne, Germany. Visit www.photokina-cologne.com for more information.

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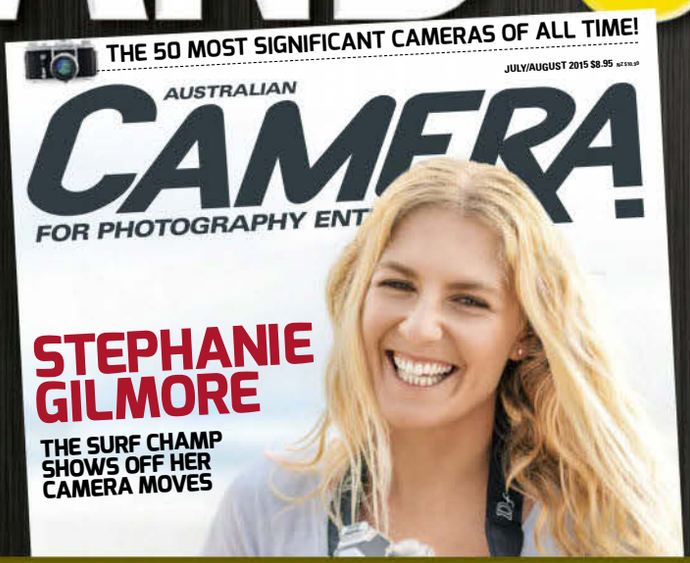

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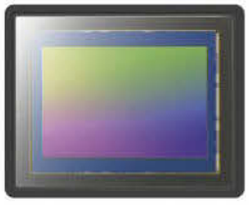
There are many improvements over the previous A7R model, including phase-detection autofocusing (using 399 points), a higher-resolution OLED-type EVF and continuous shooting (with AF adjustment) at 5.0 fps.

SONY UPS THE ANTE WITH NEW MIRRORLESS FLAGSHIP

SONY'S A7 SERIES mirrorless cameras have been suggestive of where the future might lie in the high-end market, but it's probably confirmed with the arrival of the new A7R II (a.k.a. the ILCE-7RM2).

The new A7 flagship retains the compact dimensions and lightweight of the preceding models, but steps up to a 43.6 megapixels 'back-illuminated' CMOS sensor with a sensitivity range equivalent to ISO 100 to 102,400. The A7R II has a five-axis sensor-shift image stabiliser and can record 4K video in multiple formats including 'Super 35' (without pixel binning) and full-35mm (i.e. using the full width of the sensor). The new sensor doesn't have an optical low-pass filter and is claimed to have a data read-out speed that's 3.5 times faster than that of the previous model. It incorporates 399 phase-detection autofocusing points – along with 25 using contrast-detection – covering 45 percent of the frame and giving a 40 percent increase in the focusing speed compared to the A7R (which only used contras-detection). A new motion-detection algorithm enables continuous autofocusing with AF adjustment between frames at up to 5.0 fps. Importantly, phase-detection AF operations are retained when Sony A mount lenses are used on the A7R II via the LA-EA3 or LA-EA1 mount adaptors (as is image stabilisation).

The A7R II has a new shutter assembly using a sensor-based 'first curtain' which reduces vibration – important given the higher resolution – and is tested to 500,000 cycles. The speed range is 60-1/8000 second with flash sync up to 1/250 second. The image stabiliser is claimed to give up to 4.5 stops of correction for camera shake. An upgraded EVF employs a 1.3 cm OLED display with a resolution of 2.36 million dots. It has a magnification of 0.78x and provides 100 percent scene coverage. The camera's LCD monitor screen is adjustable for tilt and has an increased resolution of 1.23 million dots.



The full-35mm CMOS sensor in Sony's new A7R II has a resolution of 43.6 megapixels and employs a 'back-illuminated' design to enable larger pixels and increased sensitivity. A new on-chip lens arrangement also helps with sensitivity which extends to ISO 102,400.

At the 4K resolution, video is recorded using the XAVC S codec at 3840x2160 pixels and 25 fps giving a bit rate of 100 Mbps. There's the option of using XAVC S, AVCHD or MP4 compression when recording Full HD video. The 4K video can be recorded internally to a memory card or externally via an uncompressed 8-bit, 4:2:2 colour feed at the HDMI terminal. The A7R II has Sony's pro-level S-Log2 Gamma setting for video shooting (which gives a 1300 percent wider dynamic range) and user-definable 'Picture Profiles' with adjustable parameters for black level, gamma, knee, colour depth, colour phase, detail and more. The built-in microphones are stereo and there's both a stereo audio input and an output for connecting monitoring headphones.

Other notable features include 1200-zone evaluative metering, 13 'Creative Style' picture presets, multi-frame HDR and NR capture modes, a magnesium alloy bodyshell, built-in WiFi with NFC connectivity, and a dual-format memory card slot for SD/SDHC/SDXC or MemoryStick Duo/Pro Duo/Pro-HG Duo.

The Sony A7R II will be available locally from August with body-only pricing expected to be in the region of $4500. For more information visit **www.sony.com.au**

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REPORT BY **PAUL BURROWS**

LEICA Q

ON THE BALL

If the T is the camera Leica had to build, the Q is the one it simply couldn't resist building… if only to show everybody else how it's done.

Probably after reading yet another observation along the lines of "… this is the camera Leica should have made" – usually in a review of one of Fujifilm's X100 models – the Germans decided to go ahead and do their own *proper* fixed-lens, big sensor, retro-styled model. It's not quite a case of anything-you-can-do-we-can-do-better, but let's face it, if anybody has real legitimacy in this space, it's Leica. Despite its heritage being in interchangeable lens cameras, when the technological stars all eventually aligned, Leica was always going to build something like the Q.

Think of it as a digital M with a fixed prime lens and an electronic viewfinder – costing considerably less than going down the interchangeable lens route –

and you can start to see the appeal. And Leica has specified the key components very carefully so the Q has a full-35mm CMOS sensor *sans* optical low pass filter to optimise its 26.3 megapixels resolution. The lens has a focal length of 28mm – not dubbed 'the cinematic focal length' for nothing – and a fast maximum aperture of f1.7. The EVF resets the bar for image quality… and is probably one of the main reasons why the time is now right for the Q. Above all else, it's a genuine Made-In-Germany Leica camera.

What's not to like? OK, so the price tag is not much shy of $6000 which does look pretty steep for a fixed lens camera, but this needs to be put in perspective given what you'd pay to have the same combo from anywhere else in Leica land (i.e. M Typ 240 body plus Summilux-M 28mm f1.4 ASPH lens = ouch!). And the question has to be asked… just how many M users typically use just one lens… usually either a 28mm or a 35mm? These focal lengths represent pretty much the essence of RF camera photography.

On a more practical note, a fixed lens means no dust-on-sensor issues and, more importantly, a more compact and, yes, less costly design… even with a fast maximum aperture of f1.7. It also means the lens is precisely matched to the sensor which has real benefits in terms of the imaging performance, particularly sharpness. In case you're wondering, the lens is marked 'Made In Germany' too.

FAMILY TIES

Although a little smaller and lighter than a digital M, the Q still looks very much like one of the family, particularly in terms of its styling (which was done inhouse), but it also has the same luxurious feel thanks to the superlative quality of its construction.

The top panel is milled from a solid lump of aluminium while the main shell is a magnesium alloy component. All the markings are laser engraved and everything works with a typically Leica smoothness and precision. There's a traditional shutter speed dial and, on the lens, an aperture ring. Both have 'A' settings so, similar to Fujifilm's X100 models, the selection of the 'PASM' exposure control modes depends on whether both, either or neither are parked on 'A'. The lens also has a manual focusing collar and its distance scale is very niftily switched over when the macro mode is selected.

However, significantly, the Leica Q has autofocusing – engaged by setting the focusing collar to its 'AF' position – and here, perhaps, is a glimpse into the future. At first glance, the Q's lens really looks like it might be interchangeable and, on closer examination, there doesn't seem any reason why a mount couldn't be accommodated. Leica has hinted that the Q – its factory code is Typ 116, by the way – is just the start, but whether there'll subsequently be a selection of fixed lens models like Sigma's quattro dp series or an interchangeable lens camera isn't clear. Nevertheless, with its EVF and autofocusing, the Q does start to look something like the basic formula for a 'future M'. We shall see.

Importantly though, Leica has nailed the EVF in the Q. It's a LCOS-type display (the initials stand for Liquid Crystal On Silicon) with a resolution of 3.68 million dots and it's quite the best we've seen so far, superior even to Sony's excellent OLED displays. It's bright with a real world colour rendition, lots of definition and a good dynamic range. While the LCOS display is a field-sequential type (i.e. each point alternatively shows red, green and blue), there's no noticeable lag or colour 'tearing' when panning.

Proximity sensors in the eyepiece enable automatic switching between the EVF and Q's monitor screen which is a fixed TFT LCD panel with a resolution of 1.04 million dots and touch control. However, unlike the all-or-nothing T, the Q's user interface is conventionally menu-based with a four-way navigator and the touch controls are there as an option (although the facility can't be switched off completely).

ESSENTIAL INGREDIENTS

The Q's sensor – source unknown and not the same device as is used in the M Typ 240 – has an effective pixel count of 24.2 million and a sensitivity range equivalent to ISO 100 to 50,000.

The effective pixel count gives a maximum image size of 6000x4000 pixels, but there's the option of recording at three smaller sizes. Additionally, there are two 'digital zoom' settings which equate to the 35mm and 50mm focal lengths and which can be selected on-the-fly via a button

DESPITE ITS HERITAGE BEING IN INTERCHANGEABLE LENS CAMERAS, WHEN THE TECHNOLOGICAL STARS ALL EVENTUALLY ALIGNED, LEICA WAS ALWAYS GOING TO BUILD SOMETHING LIKE THE Q.

on the back panel adjacent to the thumbrest. These are obviously crops, but in the case of the 35mm setting, the resolution is still 15.4 megapixels so it's a handy facility for, say, street photography. The crops are shown in the EVF and monitor just like the brightline frames in an RF camera's finder and, similarly, what's happening *outside* the frame can be seen as well. Furthermore, with RAW+JPEG capture, the RAW file is still recorded at the 28mm angle-of-view and the cropping frame can subsequently be moved around in Adobe Lightroom (which is supplied as a free download with the camera).

As is standard on Leica digital cameras, RAW files are captured in the Adobe DNG format. There's only one JPEG setting which is a manifestation of Leica's minimalist approach, encompassed in the slogan "*Das Wesentliche*" which translates as "the essential". In other words, why would anybody want to record lower quality images in-camera? Good question.

In the spirit of "*Das Wesentliche*", the Leica Q also lacks any picture presets (although JPEGs can be fine-tuned for sharpness, contrast and saturation) and, God forbid, any special effects. It does, however, have a set of subject/scene modes which include panorama stitching, an intervalometer and, just to contradict the last sentence, the 'Miniature' effect (well, it's more about focus than a gimmick, isn't it?).

The data heavy-lifting is done by Leica's current-generation 'Maestro II' processor which enables continuous shooting for stills at up a snappy 10 fps as well as video shooting at 1080/60p (see the Making Movies panel for the rest of the Q's video capabilities).

SHARP SHOOTING

The Q's AF system is sensor based and uses contrast-detection measurement without, it would appear, any 'go-faster' processes, but it's still exceptionally responsive and very reliable. There's 169 measuring points which cover virtually the entire frame with the option of automatic or single-point selection, auto tracking and face detection.

Switching between single-shot and continuous operation is manual (via the main menu), but there are 'Touch AF or 'Touch AF + Release' operations available on the monitor screen. A low light/contrast illuminator is provided.

While the AF is very capable, it wouldn't be a real Leica camera if the manual focusing experience didn't make this way of doing things arguably the more desirable option. The focusing collar is freed from its 'AF' position by depressing a small button set into its focusing tab and the subsequent movement is as smoothly fluid as that of any Leica M lens. Similar to any M lens, the distance markings are in both metres and feet, and there's a depth-of-field scale for f4, f8, f11 and f16.

The minimum focusing distance is 30 centimetres, but as noted earlier, there's a macro mode which selected by turning a ring on the lens which also cleverly switches the distance scale to the close-up range of 17 to 30 centimetres. It's Leica showing off, really, but a very nice piece of precision mechanical engineering nonetheless. Focus assist is via the distinctly modern-era devices of a magnified image (up to 6x) with a focus peaking display in a choice of four colours.

UP TO SPEED

The lens's aperture ring has click-stops in one-third EV intervals and the lens incorporates a leaf shutter with a speed range of 30-1/2000 second. It's described as a "mechanical" shutter, although of course, it's electronically controlled (and so fully dependent

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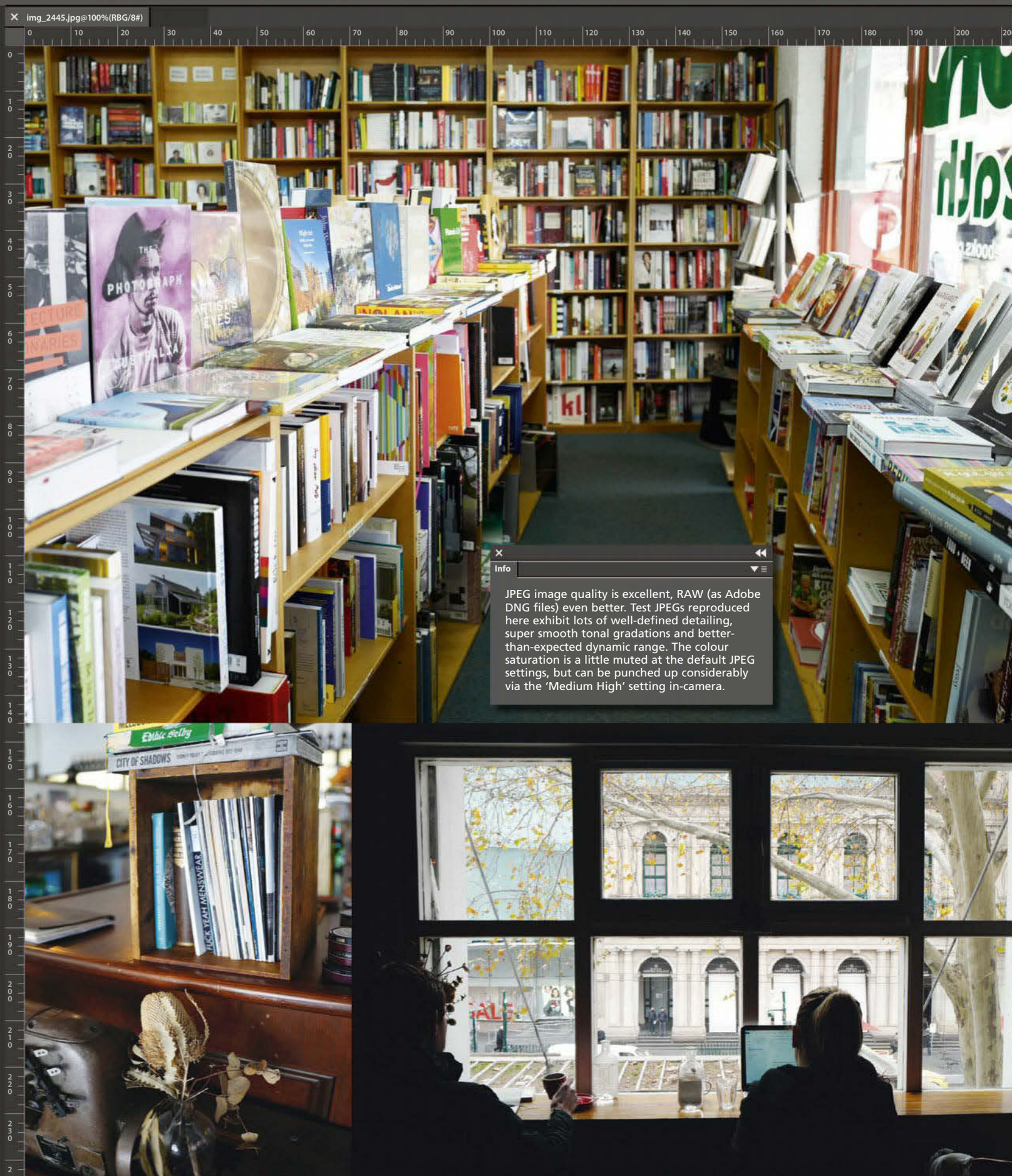
img_2445.jpg@100%(RBG/8#)
Info
JPEG image quality is excellent, RAW (as Adobe DNG files) even better. Test JPEGs reproduced here exhibit lots of well-defined detailing, super smooth tonal gradations and better-than-expected dynamic range. The colour saturation is a little muted at the default JPEG settings, but can be punched up considerably via the 'Medium High' setting in-camera.
CITY OF SHADOWS
100%
Doc: 2.8mb

on battery power) and the word is used to distinguish it from the Q's sensor-based "electronic" shutter which takes the faster speed range on from 1/2500 second to 1/16,000 second.

With the shutter speed dial set to its '2000+' settings, the faster speeds are subsequently selected the camera's command wheel. The switchover between shutter types is performed automatically. Flash sync is at all speeds up to 1/500 second, but like any M body, the Q doesn't have a built-in flash. External units sync via a hotshoe only as there isn't a PC terminal.

Multi-zone, centre-weighted average and spot metering measurements are available and the auto exposure modes are supplemented by up to +/-3.0 EV of exposure compensation and auto bracketing over the same range for a sequence of three frames.

The white balance control options comprise auto correction, five presets, provisions for making and storing two custom measurements, and manual colour temperature setting over a range of 2000 to 11,500 degrees Celsius. No bracketing or fine-tuning. Also absent are any manually-set processing functions for dynamic range expansion or noise reduction and, perhaps not surprisingly, there isn't a multi-shot HDR capture mode. No doubt Leica thinks many Q users will shoot in RAW and a sort all this out post-camera.

Pared down to the essentials, the menu is a simple arrangement comprising one, continuously-scrollable section with the submenus accessed via a right-click of the navigator. The layout is actually crisp and clean with the emphasis on functionality above all else.

The live view screen can be configured to include a guide grid (the classic 'rule-of-thirds'), a real-time histogram, a highlight warning and a single-axis level indicator plus all the important status indicators and read-outs. All are obviously replicated in the EVF.

Definitely not quite so classical, is the built-in WiFi module which provides the convenience of NFC 'touch-and-go' connectivity. The Leica Q app allows for the wireless transmission of files and remote camera control, including exposure settings. The live view image is also available at the mobile device, either iOS or Android.

Menu design is also clean, simple and intuitive.

Replay screen can be configured for a real-time histogram and highlight warning (just visible as a small black section in the top left of this illustration).

SPEED AND PERFORMANCE

With our reference 64 GB Lexar Professional SDXC (Speed Class 1) memory card loaded, the Leica Q fired off a burst of a burst of 26 JPEG frames in 2.454 seconds which represents a continuous shooting speed of 10.6 fps. The typical file size for this test was 8.7 MB so the Q has no problems delivering on Leica's shooting speed claims.

The JPEG image quality is simply delicious. The colours are slightly muted (fixed, if so desired, by setting it to 'Medium High' in the camera which adds some extra punch), but the dynamic range, crisply-defined detailing and smooth tonal gradations are all excellent.

Noise isn't an issue up to ISO 6400 and still acceptable at ISO 12,500, but the two highest sensitivity settings do exhibit some blotchiness in areas of continuous tone and the colour saturation suffers accordingly, but the sharpness less so. Nevertheless, the RAW files contain just so much detail that post-camera noise reduction can be applied without unduly diminishing the overall image quality. This, combined with the f1.7 lens speed and image stabilisation, give the Q exceptional low-light shooting capabilities.

Of course, the lens is part of the deal here and there's a distinctly Leica 'look' in terms of the contrast and colour balance. Centre-to-corner sharpness is pretty good even at f1.7, but excellent from f2.8 and beyond. There's no vignetting and it's very highly corrected in terms of distortion – three aspherical elements are included in the optical construction – and both

"A FIXED LENS MEANS IT'S PRECISELY MATCHED TO THE SENSOR WHICH HAS REAL BENEFITS IN TERMS OF THE IMAGING PERFORMANCE, PARTICULARLY SHARPNESS."

While it's resolutely a stills camera in design, the Leica Q is actually reasonably capable in the video department. Full HD resolution clips are recorded in the MP4 format (using MPEG 4 AVC/H .264 compression) at either 30 fps or 60 fps. Alternatively, you can record at 720/30p in the MOV format. Given its heritage, it's perhaps a bit surprising that there's no 24 fps 'cinematic' recording speed.

The Q has built-in stereo microphones – located just ahead of the hotshoe – and provides both a gain adjustment (to vary the sensitivity) and a switchable wind-cut filter. There isn't a stereo audio input which is a pretty clear indication that the Q isn't really intended to be a serious video camera.

Image adjustments are provided for sharpness, contrast and saturation, while image stabilisation and continuous AF are available. Interestingly, the lens employs just one element for autofocus adjustments so the operation is virtually silent which is a bonus when shooting video. Exposure control is fully automatic (including the ISO), but with the provision of the compensation override and the choice of metering methods. A dedicated video recording start/stop button is located adjacent to the shutter release on the camera's top panel. There's also a dedicated 16:9 aspect ratio imaging frame.

Even if video is only a part-time job for the Leica Q, it's still pretty good at it, delivering nicely stable footage and no discernible rolling shutter effects.

The auto exposure control adjusts pretty smoothly and rather quickly, but the contrast-detection AF isn't nearly as responsive. The good news here is that the finger tab on the focusing collar actually enables nicely smooth manual control… with the assistance of both a magnified image and a focus peaking display.

spherical and chromatic aberrations. The Q does perform some in-camera corrections for lens aberrations, but regardless of how it gets there, the end result is nothing short of brilliant.

The out-of-focus effects are beautifully smooth so images exhibit real depth and allure. And the 28mm focal length is hugely versatile, providing plenty of scope for experimenting with composition and provides the 'room' to crop later on if necessary.

Part of the whole Q experience us undoubtedly the handling. It feels like an M and can be worked like one too, but there's also the option of going to full point-and-shoot operation – complete with touch screen controls – or any auto/manual combination that's preferred in between.

However, what's really telling is that the Q is as comfortable – and pretty much almost as efficient – to use with manual focusing and exposure control as it is to set everything to auto. The simplicity – and this word is used in a very positive sense – is refreshing and, much more so than the T, the Q balances the traditional and contemporary in a way that gives it far wider appeal.

THE VERDICT

Let's talk money. Live with the Leica Q for even a short period of time and the price tag becomes easier to justify. It *is* an expensive camera, but then it is a full-blown Leica – in terms of the build quality (both body and lens), the way it operates and the performance – and it's also a combination of features and capabilities that makes for an immensely competent package… more so straight out of the box than any of the models suggested as rivals. And, in the end, there's also a certain degree of exclusivity that comes with Leica's 100-year-old legacy and the considerable reputation that this has built. In the end, potential buyers will have to decide whether they're happy to pay a premium to have this cache.

But beyond the brand and the badge, the Leica Q is a truly fine camera that's a sheer joy to use and delivers wonderful results. Can't really ask for anything more than that.

VITAL STATISTICS

LEICA Q $1499

Type: Fixed prime lens digital compact camera with electronic eyelevel viewfinder.
Lens: Leica Summilux 28mm f1.7 ASPH. Eleven elements in nine groups (three aspherical types). Aperture range is f1.7 to f16 adjustable in 1/3-stop increments. Built-in optical image stabilisation. Metal lens hood supplied.
Focusing Type & Range: Contrast-detection measurement with 169 focusing points. Auto/manual point selection, face recognition and auto tracking modes. Focus frame adjustable for size. Range is 30 cm to infinity. Macro focusing down to 17 cm. Manual switching between single-shot and continuous modes. Low light/contrast assist provided by built-in illuminator. Manual focus assist via magnified image (up to 6x) and focus peaking display (red, green, blue or white). Touch AF operation available via monitor screen.
Shutter Type & Speeds: Electronically-controlled leaf, 30-1/2000 second plus 'B'. Flash sync up to 1/500 second. Sensor-based shutter has a speed range of 1-/2500-1/16,000 second.

Metering: Multi-zone, centre-weighted average and spot.
Exposure System: Program (with shift), aperture/shutter-priority auto and manual plus 11 subject/scene modes. Up to +/-3.0 EV exposure compensation, an AE lock and auto exposure bracketing (over three frames).
Sensitivity: ISO 100, 200, 400, 800, 1600, 3200, 6400, 12,500, 25,000 and 50,000.
Sensor: 24.0x36.0 mm CMOS, 26.3 million pixels total (24.2 MP effective). No optical low pass filter.
Image Size: 6000x4000, 4272x2848, 2976x1984 and 1600x1080 pixels. 14-bit RAW (Adobe DNG) files captured at 6000x4000 pixels. RAW+JPEG capture available.
Video Recording: MP4 format at 1920x1080 pixels; 60 or 30 fps (progressive scan) and 16:9 aspect ratio. MOV format at 1280x720 pixels at 30 fps (progressive scan) and 16:9 aspect ratio. MPEG 4 AVC/H .264 compression. Stereo microphones built-in with gain settings and wind filter. No stereo audio input provided.

Continuous Shooting: Up to 10 fps – with continuous AF – for a burst of up to 40 images with JPEG/large/fine capture and up to seven images with RAW capture. Medium speed continuous shooting at 5.0 fps and low speed at 3.0 fps
Formats: JPEG, Adobe DNG, MP4.
Flash: No built-in flash. External flash units sync via a hotshoe.
White Balance: TTL measurement via image sensor. Auto, five presets, two custom measurement and manual colour temperature setting (2000 to 11,500 degrees Kelvin).
Viewfinder: Electronic, LCOS-type with 0.65x magnification, 3.68 million dots resolution and 100 percent frame coverage. Eyepiece strength adjustment built-in. Auto/manual switching between EVF and monitor screen.
Storage: SD/SDHC/SDXC memory cards with UHS-I support.
Interface: USB 2.0, Micro HDMI (Type D).
Additional Features: Aluminium/magnesium alloy bodyshell, 7.62 cm fixed monitor screen (1.04 million dots resolution) with touch controls, digital zoom (1.2x or 1.5x, but standard 28mm field-of-view retained with Adobe DNG file), JPEG picture adjustments (contrast, saturation and sharpness), monochrome shooting mode, sRGB and Adobe RGB colour space settings, in-camera panorama stitching, intervalometer for time lapse, customisable 'Fn' button, dual-delay self-timer (two or 12 seconds), audible signals, real time histogram display, guide grid, highlight warning, level indicator, 12/30 thumbnail displays, playback zoom, built-in WiFi transmitter with NFC connectivity.
Power: Rechargeable 7.2 volts, 1200 mAh lithium-ion battery (BP-DC12 type).
Dimensions (WxHxD): 130.0x80.0x93.0 mm.
Weight: 590 grams (without battery or memory card).
Price: $5900. Available in black only.

Distributor: Leica Camera Australia Pty Ltd, telephone (03) 9248 4444 or visit www.leica-camera.com

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WALL OF FIRE

The Picture

Taken as a creative exercise in car photography to symbolise that cars are dynamic, exciting and often "raw and angry' subjects. "Fire is raw, it's angry, it smells, it's dirty, it's loud and, in essence, it's essential for making horse power," says photographer Shaun Ross.

The location is a carpark somewhere on Sydney's northern beaches, chosen specifically because there were no external light sources nearby (street lights, etc) and it was a very large open area with only single-storey buildings surrounding it that could be concealed by the fire wall.

The Photographer

Frustrated with the unpredictable nature of natural light particularly when shooting landscapes, Sydney-based Shaun Ross turned to night photography and began experimenting with the many ways he could manipulate the way the camera records light using longer exposures with all manner of sources of illumination. This experimentation has included painting with light and… the fire wall!

The Equipment

Canon EOS 5D Mark III with a 35mm f1.4L lens, mounted on a tripod with a wireless shutter release. But… that's just the camera gear. The equipment for creating the fire wall included an extendable decorator's pole, three metres of Kevlar rope, two aluminium karabiner clips, two 8.0mm stainless steel marine rope clamps, one M6x40mm eye bolt, one builder's plumb bob with a small nut welded to the top, a one litre bottle of kerosene and a five-litre plastic laundry bucket.

The safety equipment comprised one dry powder fire extinguisher, one CO2 fire extinguisher, an extra-large fire blanket, one extra-large (and wet) beach towel, leather gardening gloves and clear safety goggles.

The Technique

There are a number of unusual techniques that are required to take this shot and they require some practice to master, but first Shaun had to make the fire pole. He did this by cutting the top off the decorator's pole, drilling a hole through it and attaching the eye bolt. Next he made a small loop at each end of the rope and used the clamps to tie it off and feed the karabiners through the loops. He connected one karabiner to the eye bolt and the other to the plumb bob. The plumb bob is used to weigh down the rope and help keep it taut.

Shaun explains, "The first technique I practiced before taking the shot was learning how to light

Photograph by Shaun Ross, copyright 2015.

and extinguish the fire rope. This is extremely important for safety reasons. To light the rope, you first need to soak it in kerosene for around two to three minutes. Next connect the rope to the pole and move away from the kerosene bucket. To light the rope, curl it up and light it with either a cigarette or BBQ lighter. Once the rope is completely alight, you can lift the pole up. To extinguish the rope, curl it up once again on the damp beach towel and then fold the towel over the curled rope to smother the flames.

> ***Fire is raw, it's angry, it smells, it's dirty, it's loud and, in essence, it's essential for making horse power.***

"The second technique I had to learn was walking with the fire pole. Walk too fast and the fire wall will have 'holes' in it. Walk too slow and the fire wall becomes too bright and you lose the beautiful definition in the flames. To work out the timing of the walk, I used a metronome app on my smartphone and took numerous test shots to get the firewall effect I was after, keeping the aperture and ISO at the same settings.

"The final technique required was to work out where my entry and exit points where within the shot. I used reflective tape and placed them about one metre before my entry point and one metre after my exit point in the shot. The reflective tape made it easier to locate these points in the dark."

How It Was Done

The camera and tripod were placed about three metres away at a 45-degree angle from the front corner of the car. Shaun used a flood light to make sure he had the car framed up correctly. The camera to 'bulb' for a long exposure, f11 and ISO 100. The white balance was set to custom at 6500 degrees Kelvin. The metronome was set to 80 beats per minute. Using a spot light, Shaun set his focus point half-way along the driver's door. Next he lit the rope and got into position next to the entry point marker. Once the fire rope was well alight, he set off the metronome, opened the shutter with the wireless remote, and walked through the shot in time with the beat. Once he reached the exit marker, he closed the shutter and extinguished the flames.

Tricks Of The Trade

Moving the pole up and down and inch or so as you walk along helps to provide more oxygen to the flame and gives them a beautiful fanning effect. To hear the beat of the metronome over the flames, Shaun used a set of in-ear head phones… as the roar of the flames can get quite loud. He advises to shoot on still nights as wind gusts will cause the flame to oxidise and 'white out' the fire wall.

Degree Of Difficulty (Out of 10)

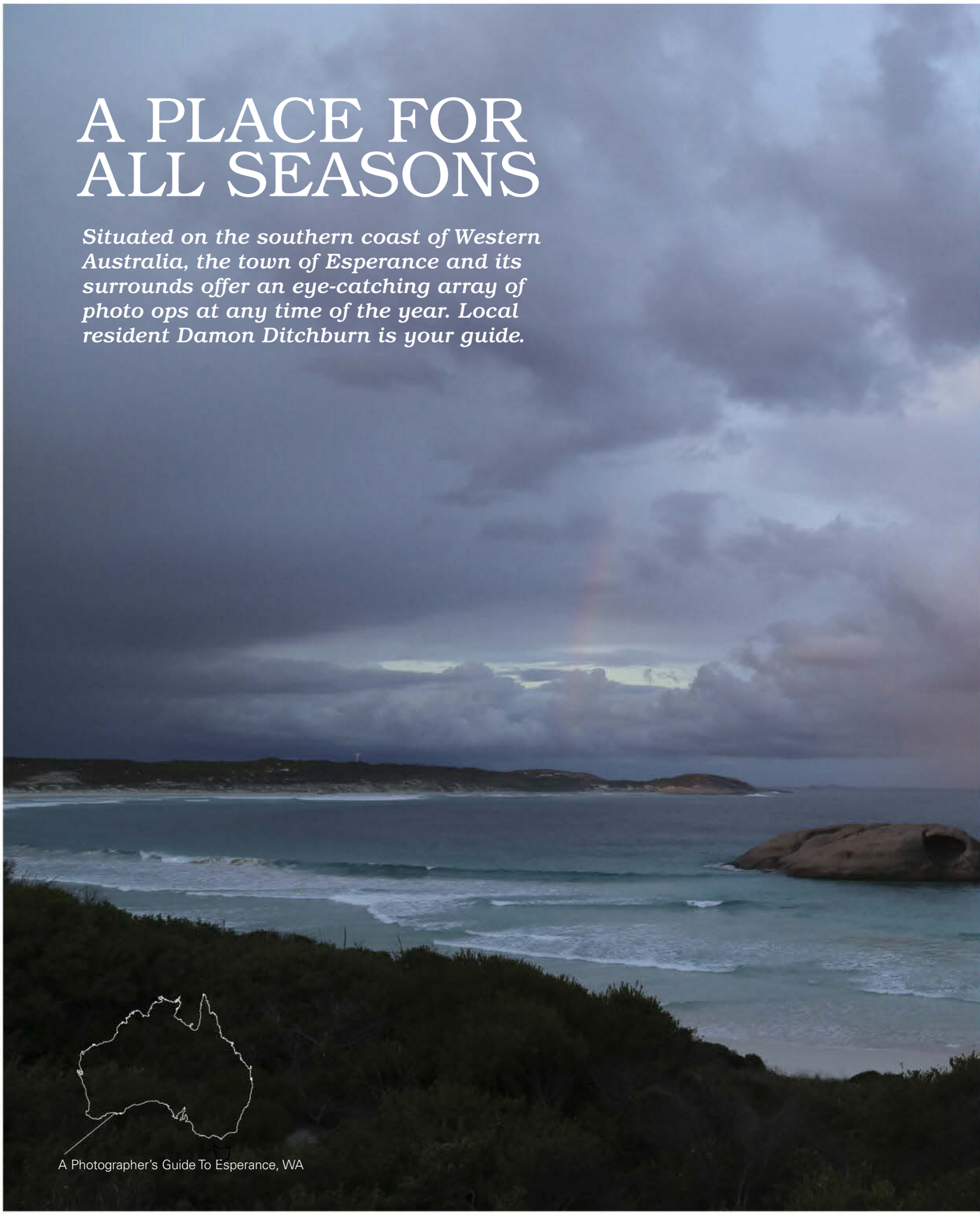
Shaun modestly gave himself a score of six, but we reckon this is easily a ten and… given the potential for it to all go horribly wrong… probably an '11'.

Can You Try This At Home?

Er, in a nutshell… no.

A PLACE FOR ALL SEASONS

Situated on the southern coast of Western Australia, the town of Esperance and its surrounds offer an eye-catching array of photo ops at any time of the year. Local resident Damon Ditchburn is your guide.



A Photographer's Guide To Esperance, WA

ALL PHOTOGRAPHS BY DAMON DITCHBURN, COPYRIGHT 2015.

33*51'40" S and 121*53'31" E, the Recherche Archipelago, Bay Of Isles, kepa kurl (the aboriginal name meaning "where the water lies like a boomerang")… have you worked out the name of this beautiful part of Western Australia yet?

You probably better know it as Esperance, the small coastal town situated 720 kilometres east-southeast of Perth. It's the last major town on the south west coast, and its isolation provides an environment that is pristine and relatively untouched in terms of development. Amazing, spectacular, magic are just some words used to describe this wonderful region of Australia. A very photogenic place indeed.

Your choices for photography are only limited by your imagination and the vehicle you have at your disposal. Visitors with a capable four-wheel-drive and the relevant experience will have an incredible amount of places to visit. But owners of two-wheel-drive vehicles shouldn't be put off as there are still great opportunities to get out and experience what makes this place so special.

The first stop should be at the Esperance Visitor's Centre. Situated on Dempster Street, this is a great place to gather information on exactly what the region has on offer. Details about accommodation, tours, maps and events can all be sourced from here. Another excellent source of information is the C.A.L.M. office – a little further down the street before the Post Office. This is the best place to get information about the National Parks in the area. C.A.L.M. rangers and staff know the current conditions (i.e. about the roads, access and campsites) and the costs to visit the parks, either for a day trip or an extended stay. Once you have gathered the information you need, get out there and start snapping.

> ***"On those rare good weather winter days Esperance provides numerous subjects for your consideration."***

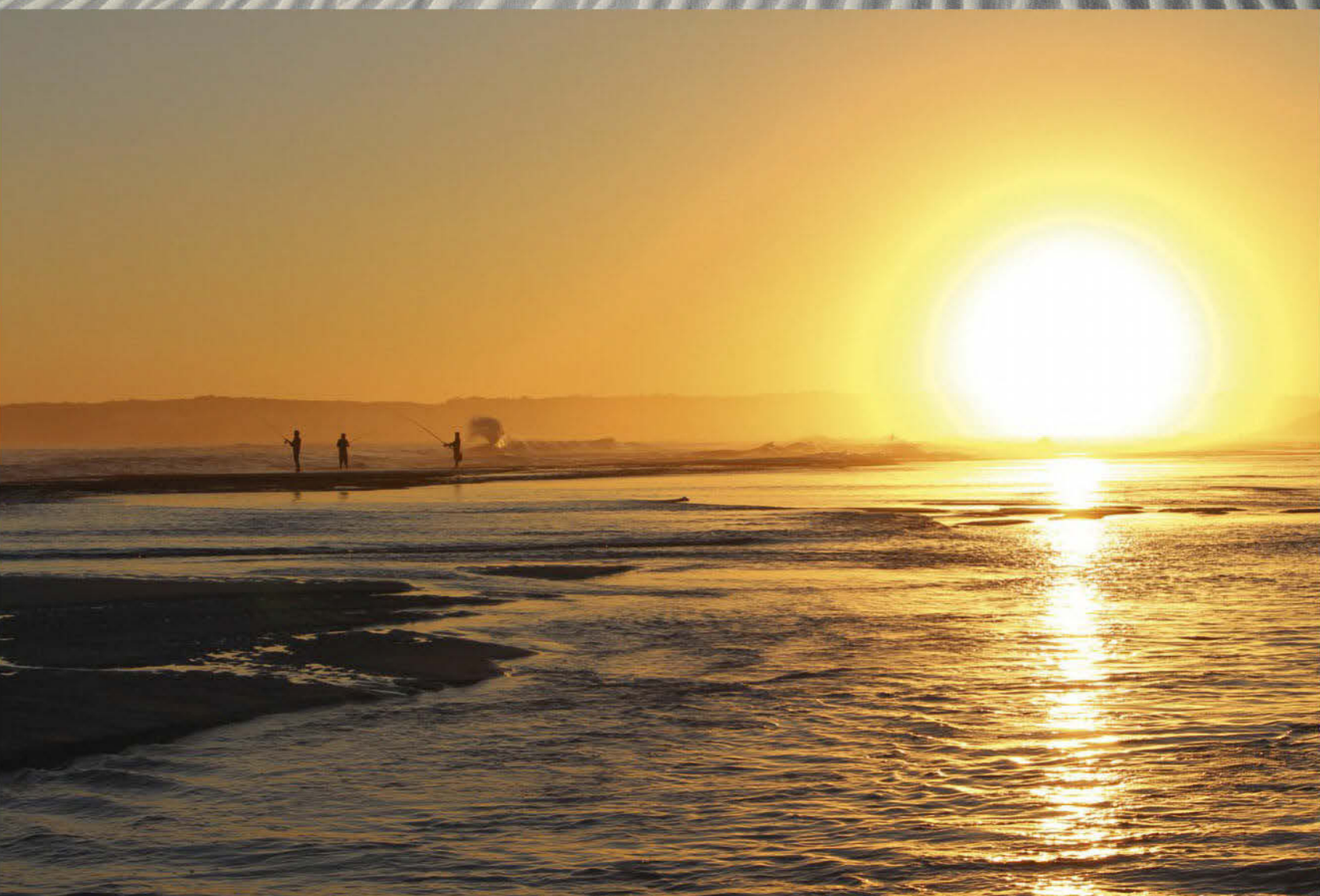
WINTER

Esperance truly is a place for all seasons – even in winter. Often this time of year isn't the photographer's friend – the cold, the wind and the rain don't encourage you to get out and explore. But on those rare good weather winter days Esperance provides numerous subjects for your consideration.

The magnificent beaches are a great place to start. The winter swells hitting the rocks, the rolling clouds, glowing white sand and jewel-like blue ocean waters supply endless photo opportunities. The Tourist Loop is a fantastic choice to experience this epic coastline. It will take you past some truly unique seascapes such as at Blue Haven, Salmon Beach, Twilight Cove and Observatory Beach, just to name just a few. If you have travelling companions, get them to keep an eye out for dolphins surfing in the waves or the blow of a whale as it journeys east to Cape Arid National Park and onto Antarctica.

Cape Arid is the best place to witness the whales breaching and having fun. It's quite a remote and isolated location so good preparation (supplies, water and a 4WD) is very important.

A closer National Park is Cape Le Grand, roughly 55 kilometres east of Esperance. Accessible to all vehicles and with great amenities (BBQ, toilets, showers and picnic areas), Cape Le Grand will serve up some special moments to capture. You will be able to decide for yourself if Lucky Bay truly has the whitest sand you have ever seen. Witnessing the greening of the country side and the beginning of the wildflowers are an added bonus in winter.



Fauna and flora: a Bearded Dragon and a trio of orchids – two Spider Orchids (lower images), and a Donkey Orchid.

"Spring + Esperance = Wildflowers. Wildflowers can keep you occupied for days or even weeks. The diversity of plant life is breath-taking."

SPRING

If winter weather isn't your cup of tea, how about spring? Spring in Esperance is utterly splendiferous (yes, it's an actual word). Granted, the weather can still be a little temperamental, but the photographic rewards on offer are worth it.

Spring + Esperance = Wildflowers. Wildflowers can keep you occupied for days or even weeks. The diversity of plant life is breath-taking. Orchids are a favourite subject to seek out. It is always a joy to go 'orchid hunting' especially with a friend. Once you get your eye in and start to find them, you will be amazed at just how abundant they are.

One of the easiet places to start orchid hunting is at Wireless Hill – it's the tallest landmass in Esperance so it's not hard to find. Check out the view from the Rotary Lookout then head off on the well-marked walking trail. With a litle bit of venturing off track, you should have no trouble finding plenty of Spider, Donkey and Sun orchids. Although not an orchid, an insectivorous plant Drosera is also easy to find with its bright white flowers and sticky glistening cups full of prey. The many shrubs passed along the way should be in bloom thanks to the winter rains.

Another recommended area is the Kepwari Walk trails, less than ten minutes from the centre of town. This spot not only has excellent potential for seeing orchids, but also for bird lovers. The tracks take you around a world significant wetlands system where there are huge numbers of both migratory and indigeneous birds. So, with a telezoom or prime telephoto lens and some patience you should come away with images of Pelicans, Black Swans, Spoonbills, many different species of duck, White Storks, and many different birds of prey… the list is endless.

Twenty minutes north of Esperance, on the way to Norseman, is Helms Arboretum which is an exceptional place to explore. The information booth here explains how it all came into existence. Then you can set off towards the man-made forest and be dazzled by the vast variety of trees planted in the area. The colours and patterns, their flowers and fruit make wonderful subjects. If you look in the right areas (under stands of eucalypts) hundreds of Spider orchids and Sun orchids will start to come into focus. As with any exploring in the bush, be mindful of snakes; you are in their home so tread carefully.

SUMMER

Esperance summers are very pleasant indeed. If you love the beach you will love Esperance. Don't forget to slip, slop, slap and take sunglasses as the white sand on a sunny day is blinding. With the longer daylight hours, there is more time available to plan expeditions further out of town. The weather is extremely favourable for those who like extended stays in one of the many camping spots throughout the region.

The famous coastline provides a plethora of vistas, showing off the magical colours on show during the summer months in Esperance. Why not travel inland to some areas just as exciting as the coast? Frenchman's Peak, Mount Ridley, Peak Charles, Balbinya, Brook's Homestead, Mount Ragged, Boolenup Lake, the Moir Homestead ruins… refer to those trusty maps and choose.

All the National Parks in the region have scenic walking tracks. Check in with C.A.L.M. rangers for any extra information that might be required. There are many nature reserves along roadsides throughout the shire of Esperance which can provide great little spots for getting out the camera and having a wander around. Just pay attention to your location and try not to get lost.

AUTUMN

Autumn is probably the best season for intensely coloured sunrises and sunsets. The colours can be mesmerising. Combined with the white sand and blue Southern Ocean, the results are astonishing. All the activities and locations mentioned previously still offer plenty of photographic opportunities (except, of course, the annual spring wildflowers).

Many other plants will have taken advantage of the late-summer and early-autumn rains and will be putting on a show. Visit Helm's to see the euclypti shedding their bark, and the earthy colours and patterns underneath. If there has been some good rainfall, travel to Cascade Falls on the Loop Road along the Lort River to see the river cascading over an exposed granite outcrop.

Esperance is a photographer's paradise in all seasons. To experience all four seasons gives you a true appreciation of how special this part of the world really is. There is such a diverse and wide range of landscapes and subjects to inspire your photography… and your soul. It's guranteed you won't leave dissappointed. And, once you have been touched by this place, you'll want to come back for more.

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◀ Moir Homestead ruins, Fanny Bay; dolphins surfing at Observatory Beach; and Autumn sunset, the lakes area, Kepwari Walk Trail.

BEING THERE

Do you have a favourite place in Australia for photography? We'd love to hear about it. We need between ten and 12 good quality images and around 1500 to 1200 words describing the region, the best spots for photography, how to get around and a few tips for visiting photographers (with regard to weather, seasonal changes, road conditions, available services, etc.).
So, if you fancy yourself as a travel writer, here's your chance (and, yes, you will get paid). Images can be in any form, either film or digital files, but the latter need to be of sufficient quality for magazine reproduction (i.e. at 300 dpi resolution and at least 15x20 cm in size). Please also remember to add the text file to the disc… a number of submissions have turned out to be pictures only.

Send your submission to Camera Magazine, Next Media Pty Ltd, Locked Bag 5555, St. Leonards, NSW 1590. If you want to discuss a possible location, send a brief outline via email to pburrows@nextmedia.com.au

SUBMISSIONS UPDATE

For readers interested in contributing to 'Photogenic Places', below is a list of the locations that have been covered by articles submitted, but not yet published. Check here to avoid doubling up. As a rough guide, we're now suggesting you concentrate on a smaller area rather than providing a regional overview, perhaps with a more detailed description of what's available to see and photograph.

- Fraser Island (Queensland)
- Mungo National Park (NSW)
- Lake Albert (Victoria)
- Murrindindi (Victoria)


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REPORT BY PAUL BURROWS

CANON EOS 5Ds

GOING FOR GLORY

There's no such thing as a free lunch so making the most of 50 megapixels resolution means rethinking the way you shoot, but if you're prepared to do the hard yards, the EOS 5Ds delivers sublime performance.

While Canon would no doubt love you all to be queuing up waving your credit cards and ready to jump into the magical world of 50 megapixels resolution, the reality is that the EOS 5Ds and its 5Ds R sibling aren't for everybody. As we've already seen with Nikon's D800 Series models, ultra-high resolutions come with some caveats and this is even more the case with Canon's 'fabulous fifties'.

Of course, the image quality is indeed magnificent – there's no need to wait for the end of this test report for us to reveal this – but to make the most of what Canon is offering here, there are quite a number additional factors to take into account. Things you won't have had to think about before when shooting with D-SLRs in the range of 16 to 24 megapixels, either 'APS-C' or full-35mm sensor format.

The big question is whether you actually need 50 megapixels of resolution and this actually needs to be asked of even professionals, but more so of amateurs, even the keenest ones. I know, I know… we've become conditioned over the last decade to thinking that having more pixels is always a good thing – and fundamentally it is – but there's more to it than just bigger numbers. Much more.

The EOS 5Ds is, in Canon's own words, "an alternative to medium format cameras" and that, in itself, makes it a different animal to any other full-35mm format D-SLR… even the 5D Mark III. There are actually some quite significant variations between these two models which highlight the differences in their intended applications. For starters, video is a secondary consideration. As you can read in the 'Making Movies' panel, the EOS 5Ds is actually pretty capable in this department, but this is really because any D-SLR has to be these days. However, the design emphasis with the 5Ds/R is very much on delivering the optimum still imaging performance. This includes upgrades to both physical elements – such as the reflex mirror mechanism – and the control systems to deal with the increased demands inherent in an effective resolution of 50.6 megapixels.

The sensor's total resolution is 53 megapixels which, on a sensor with an area of 24x36 mm, results in a pixel pitch of 4.14 microns (similar, incidentally, to that of the 'APS-C' format EOS 7D Mark II). On the 5Ds, the sensor has a conventional optical low-pass filter to counter moiré patterns, but the R version employs an OLPF cancellation system via a second filter – similar in principle to that used by Nikon in the D800E – to further enhance the resolution without completely going without some degree of correction for moiré. Apart from this, the two 5Ds models are identical.

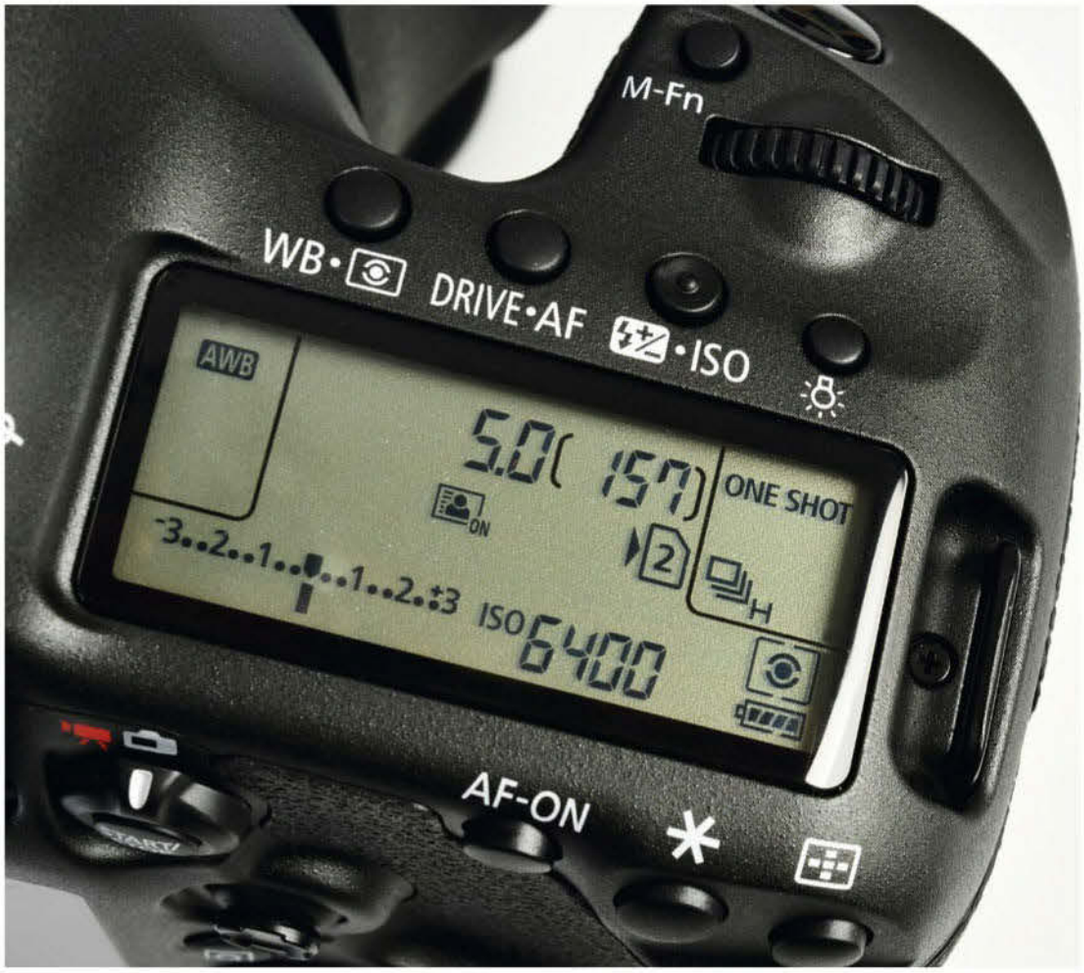
Canon has had to overcome a number of challenges to design this sensor, including creating a new array of gap-less microlenses to help improve the efficiency and give a sensitivity range equivalent to ISO 100 to 6400. There are one-stop expansion settings on either side (i.e. ISO 50 and 12,800) and while this range may not be as wide as that available on other full-35mm D-SLRs, remember that the pixel size is quite a lot smaller (for example, the 5D III's pixels are 6.25 microns).

The maximum image size is 8688x5792 pixels so this gives Canon quite a bit of 'leeway' in terms of offering smaller image sizes. Here we encounter something completely new because, normally, it would be hard to see why anything other than the maximum image quality would be used, but… take a deep breath… sometimes 50 MP could just be too much resolution. So, the 5Ds has a 1.3x crop setting which still delivers an image size of 6768x4512 pixels (and that's a healthy 30.5 MP, by the way), and a 1.6x crop setting (i.e. Canon's 'APS-C' format) which gives 5424x3616 pixels (and still 19.6 MP). These crops are selected in the main shooting menu and, very neatly, the viewfinder is masked accordingly so there's never any confusion with framing. There's also a 1:1 aspect ratio crop. RAW frames can be captured in large, medium (28 MP) or small (12.4 MP) sizes.

MANAGING THE MEGABYTES

The EOS 5Ds's sensor works in concert with a pair of Canon's latest generation of DiG!C 6 processors which, given the amount of data being generated, need to work pretty hard. Nevertheless, they enable a maximum shooting speed of 5.0 fps – faster than any 50 MP digital medium format camera – and maintain a range of on-the-fly

IT'S THE FIRST TIME WE'VE HAD A CAMERA MANUFACTURER SPECIFICALLY SUGGEST THAT USING A TRIPOD IS CRITICAL FOR OPTIMISING THE IMAGING PERFORMANCE.



Top deck monochrome info panel provides a comprehensive set of read-outs.

THE 'PICTURE STYLE' PRESETS PROVIDE MORE REFINED MANUAL CONTROL OVER SHARPNESS VIA THREE SEPARATELY ADJUSTABLE PARAMETERS – STRENGTH, FINENESS AND THRESHOLD.

Main mode dial indicates the EOS 5Ds means business… no subject/scene modes and no special effects.

processes with JPEG capture. With JPEG/large/fine capture the file size is in the region of 27 MB at ISO 100, but this could be larger with more detailed subjects and at the higher sensitivity settings. A large 14-bit RAW file is in the order of 65 MB in size and RAW+JPEG capture can represent around 85 MB of data or more. As on all Canon's higher-end D-SLRs, RAW+JPEG capture can be configured to combine any size of RAW file and any size or compression setting for the JPEGs. Regardless, there's a lot of data flying around which, of course, the camera can handle, but it means thinking about using higher-capacity memory cards – 32 GB is chewed up very quickly especially with RAW+JPEG capture – and upgrades all the way down the line in terms of a computer's processing power and speed, and the subsequent storing of images… a converted 16-bit TIFF, for example, nudges 300 MB in size.

The 5Ds has dual memory card slots, one each for the SD and CF formats, both with high-speed transfer support although, a little surprisingly, the format is only for UHS-I and not UHS-II which means longer waits while the buffer empties. UDMA-7 speed CF cards are still faster which is presumably why Canon continues to offer the two formats, rather than dual SD slots as Nikon does on the D810 and D610.

GOOD-BYE VIBRATIONS

An ultra-high resolution of 50.6 MP has other implications, in terms of both the camera and its operation… and this mostly comes down to the issue of vibration which, of course, has many possible sources.

As far as the camera itself is concerned, the biggest one is the reflex mirror mechanism which involves some fairly violent movements and major impacts as it flips up and down in the fraction of a second. Canon has gone back to the drawing board with the EOS 5Ds, replacing the conventional spring-actuated mechanical arrangement with an electric motor which is able to slow the mirror down as it approaches the end of its travel thereby minimising 'slap' (which ordinarily sends waves of vibrations throughout the camera body). A spin-off benefit of the motordriven mirror is quieter operation.

Users of long telephoto lenses often use mirror lock-up to eliminate these vibrations and Canon has taken this facility further on the 5Ds, providing a selection of delay times. These make mirror

lock-up much more convenient to use as it's simply a case of pressing the shutter release… the mirror lock-ups and, after the set delay time (from 1/8 second up to two seconds), the shutter automatically opens and closes.

Vibration – this time of the camera-shake variety – requires different ways of working with the 5Ds. A tripod becomes much more essential even when shooting in very bright conditions with faster shutter speeds. Indeed, Canon Australia recommended that our test images should be taken with the camera mounted on a tripod – which we do anyway, but it's the first time we've had a camera manufacturer specifically suggest it's critical for optimising the imaging performance.

STAYING SHARP

Which brings us to the subject of lenses. As Nikon did when it launched the D800/D800E (and subsequently with the D810), Canon recommends specific lenses for use with the 5Ds and 5Ds R, which is why our test camera arrived fitted with the EF 85mm f1.2L II USM fast prime, an otherwise unusual choice. Lovely, mind you, but unusual.

Not surprisingly, this list of recommended lenses comprises largely the high-end L Series lenses and mostly those of the more recent 'II' vintage (although there are a few exceptions), giving a choice of over 35 models from fish-eye to supertelephoto. Many of these incorporate optical image stabilisation which has added importance when the pixel density is so high, but as a general rule the minimum 'safe' shutter speed – especially when shooting hand-held – will actually need to be a lot faster than what could have been used previously.

Obviously these are practices and disciplines familiar to the users of digital medium format camera systems, and it's worth noting that Canon includes "studio" and "commercial" in its list of the likely applications for the EOS 5Ds/R. Both imply tripod-based shooting.

For most non-professional users, what all this really means is a new way of working… primarily slower and more considered with an increased need to use a tripod. It'll probably also mean greater use of manual controls, for example to ensure a fast enough shutter speed if you are going to shoot hand-held. Any sloppiness in technique with regard to anything influencing sharpness will compromise the 5Ds's vast potential.

IT'S ALL IN THE DETAILS

Canon has provided some 'on board' options for maximising sharpness starting with a new 'Picture Style' preset called Fine Detail which, by default, processes the image for increased sharpness. However, it and all the other 'Picture Styles' provide more refined manual control over sharpness via three separately adjustable parameters – Strength, Fineness and Threshold. These work in a similar fashion to Photoshop's Unsharp Masking, so Strength controls the amount of sharpening, Fineness determines the size of the details which will be sharpened, and Threshold sets the contrast level at which an edge would be subjected to sharpening. This is pretty sophisticated and some degree of experimentation is necessary to determine how these adjustments play out in an image, but it is possible to more precisely match the scope and character of any sharpening to a particular subject or scene.

As before, the other 'Picture Styles' are labelled Standard, Portrait, Landscape, Neutral, Faithful and Monochrome; and, in addition to sharpness, determine the contrast, colour saturation and hue. There's also an Auto preset which adjusts these parameters according to analysis of the AF and AE data, plus provisions for creating and storing three user-defined 'Picture Styles'.

Quite a fuss is being made of the fact that the EOS 5Ds isn't as capable as a video camera as the 5D Mark III, but this is missing the point entirely.

Canon has primarily designed the 5Ds for high-end photography (with even studio work included in its likely applications) so it's not even meant to be a replacement for the 5D III which will actually continue to be the videographer's D-SLR darling.

As it happens, while it lacks a few pro-level video features – most notably a stereo audio output for connecting headphones and the availability of a 'clean' uncompressed output at the HDMI terminal – the 5Ds is still reasonably well-equipped as far as shooting movie clips is concerned. Most interestingly, although it could quite easily record 4K video, the 5Ds doesn't, leaving this capacity as the exclusive domain of Canon's dedicated Cinema EOS cameras.

Nevertheless, it records Full HD video using the whole sensor – subsequently downsized without any pixel binning – which means exceptional image quality is possible, particularly in terms of detailing and definition. In the PAL TV standard, there's the choice of shooting at either 25 or 24 frames (progressive scan) with either IPB or ALL-I compression (i.e. in multiple frames or frame-by-frame, the latter obviously being easier to edit). Also beneficial at editing time is the embedding of SMPTE time-coding.

Clips are recorded in the MOV format using the MPEG 4 AVC/H .264 codec and, when the 4.0 GB file size limit is reached, the camera seamlessly starts a new file so the limit on clip length is time – up to 29 minutes and 59 seconds.

Although there's little doubt the twin processors could handle it, the 5Ds doesn't offer a 50 fps (or 60 fps for NTSC) recording speed. As on the 5D III, a very nice feature is 'Silent Control' which converts the 'Quick Control' wheel into a four-way touch pad, enabling noiseless adjustment of settings such as the shutter speeds and apertures, the ISO, exposure compensation and the sound recording levels.

The built-in microphone is mono, but there's a 3.5 mm stereo input for connection an external mic. The left and right audio channel levels can be manually adjusted in-camera (over a usefully wide range) with a set of level meters shown in the movie recording information display. Both a wind filter and an attenuator are provided.

Most of the main processing and correction functions available for still photography are also available for video recording, including the 'Picture Style' presets, exposure compensation, noise reduction, the 'Auto Lighting Optimiser' dynamic range expansion and 'Highlight Tone Priority'. The native ISO range of 100 to 6400 is available (but not the expansion settings) and exposures can be preset via any of the 'PASM' modes.

Continuous autofocusing during recording is provided by the 'Movie Servo AF' mode, but this uses contrast-detection measurements so its real-world usability is limited by the slower operating speeds. Manual focus assist is via a magnified image (adjustable from 6x up to 16x), but there isn't a focus peaking display which is proven to be really helpful with fine-tuning (even when shooting stills).

A bit surprisingly given video is a sideline for this camera, it has a really nifty facility for making time-lapse movies – actually a first for Canon D-SLRs – which processes the stills in-camera, turning them into a Full HD movie. Again, the interval adjustments can be set from one second up to 99 hours, 59 minutes and 59 seconds, while the number of frames ranges up to 3600 with a maximum of two minutes and 30 seconds of playback time.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Info

Image quality is superlative, but obtaining the optimum sharpness and definition requires a more careful approach to shooting to eliminate all sources of vibration and camera shake. These test images are JPEG/fine/files shot with the EOS 5Ds mounted on a tripod and using the mirror lock-up with delayed shutter release. The lens is Canon's EF 85mm f1.2L II USM. In general, Canon recommends using the later 'II' versions of its L Series lenses to ensure the optical resolution is up to the job of handling 50 MP. High ISO performance is also exceptional with excellent detailing, colour rendition and dynamic range maintained all the way up to ISO 6400.

Also in the interests of optimising sharpness, the EOS 5Ds gets a upgraded autofocusing system. It's based on the 5D III's 61-point system, but has the 5Ds's new 150,000-pixels 'RGB+IR' metering sensor to assist it in areas such as face recognition and determining the shape, size and colour of a subject. The 61 points are widely spread across the frame (the module is 19 mm in width) and include 41 cross-type arrays – ten on either end and 21 in the middle. Furthermore, the vertical row of five centre points comprise dual cross-type arrangements (i.e. a combined + and x arrangement) and are in operation with lenses that have a maximum aperture of f2.8 or larger. The full 41 cross-type arrays are available with lenses as slow f4.0 and the central 21 with f5.6 lenses. A single, central cross-array is still available at f8.0 with all the remaining points acting as either vertical or horizontal arrays. Low light sensitivity extends down to EV -2.0 (at ISO 100), but AF assist illumination is only available when a compatible Speedlite flash unit is fitted.

As is standard on Canon D-SLRs, switching between single-shot and continuous AF operations can be done manually or automatically by the camera when subject movement is detected. Point selection can also be performed either manually or automatically with the choice of two 'Expansion' settings – giving a five-point + pattern (i.e. plus four) or a cluster of nine points (i.e. plus eight) – and no fewer than nine 'Zone AF' patterns. Whatever point configuration is selected, it can be preserved when the camera is re-orientated vertically.

Similar to the EOS 5D Mark II, the 5Ds has a set of menus (five pages in all) dedicated to autofocusing, including the 'AF Configuration Tool'. This provides a choice of six scenarios for configuring the key components of continuous autofocusing, namely the tracking sensitivity, the rate of acceleration and deceleration, and the speed of the point switching. Each of the six settings is further fine-tunable to better match a real-world situation, and deeper into the AF menu is the all-important AF Microadjustment which enables up to 40 individual lens models – identified automatically via the serial number stored in their CPUs – to be calibrated, correcting for any front- or back-focusing variations.

HIGH INTELLIGENCE

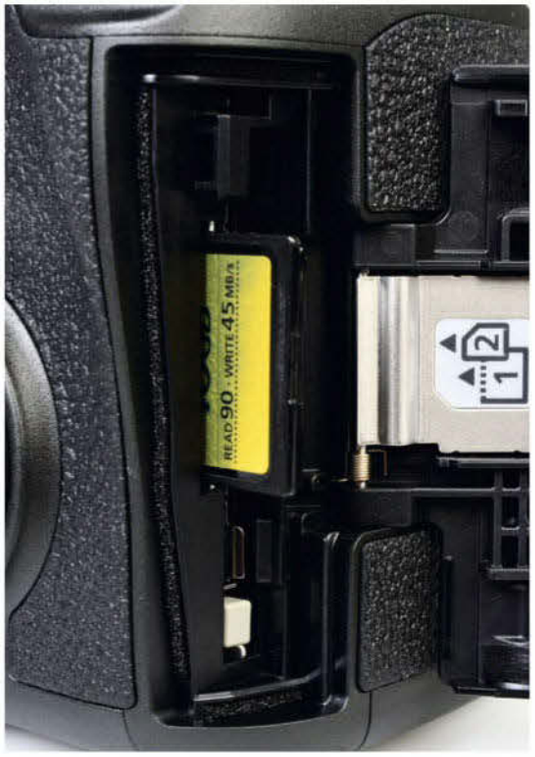
The newish 'RGB+IR' metering sensor – it made its debut on the 7D II – drives a 252-zone evaluative measurement with the option of selective area (representing 6.1 percent of the total frame area), spot (covering 1.3 percent) or centre-weighted average modes. It also controls the camera's E-TTL II flash metering although, as per all Canon's higher-end D-SLRs, the EOS 5Ds lacks a built-in flash.

The choice of exposure control options is limited to the standard selection of 'PASM' modes, but there is a 'Scene Intelligent Auto' mode which analyses a range of subject and scene characteristics to determine the most appropriate settings, including autofocus, exposure and white balance. While this is a full-auto mode, the processing behind it is quite powerful so, for example, some of the many determinations made include whether the subject is front-lit or backlit, whether its stationary or moving, the colour of the background, whether sky is included in the frame, and the colour balance of the prevailing lighting.

Back in the world of manual control, the 5Ds has an AE lock, exposure compensation of up to +/-5.0 EV and auto bracketing which can be set or operate over sequences of two, three, five or seven frames with adjustment of up to +/-3.0 EV. Additionally, the exposure compensation and the bracketing can be combined so it's possible to move the latter so it occurs around any point in the former (giving a total possible shift of either +8.0 EV or -8.0 EV). The shutter has a speed range of 30-1/8000 seconds and is rated at 150,000 cycles.

The white balance controls are upgraded to include the choice of 'Ambience Priority' or 'White Priority' modes for the automatic correction. The latter is the standard way of doing things while the former is a development of 'keep warm colours', but works with whatever colour cast is predominant. There's a fairly standard set of WB presets, provisions from just one custom setting (which seems a bit low-rent), bracketing (again over sequences of two, three, five or seven frames), fine-tuning and manual colour temperature setting.

Like all its higher-end siblings, the EOS 5Ds has Canon's 'Auto Lighting Optimiser' and 'Highlight Tone Priority' image processing functions for contrast control and dynamic range expansion. ALO analyses the image for exposure and contrast and subsequently adjusts the levels in order to avoid underexposure while still preserving detailing in the highlights. These



Dual memory card slots are provided for the SD and CF formats with UHS-I and UDMA-7 speed support respectively. The slots can be configured in a variety of ways, including for simultaneous recording of files to both.

Controls for image review and editing are arranged alongside the LCD monitor screen. Button at top provides direct access to the 'Picture Style' presets, multiple exposure facility and multi-shot HDR capture.

"THE MARKED INCREASES IN DETAILING AND DEFINITION ARE DELIVERED WITHOUT SOME OF THE USUAL PENALTIES… IT'S AKIN TO GOING ON AN ALL-CHOCOLATE DIET AND NOT PUTTING ON ANY WEIGHT!"

corrections are appended to the RAW files so they can be applied during post-production. 'Highlight Tone Priority' works differently, adjusting the tone curve in the range from 18 percent grey to the brightest highlights in order to ensure more detail is retained in the highlights without affecting the shadow areas. The two can't be used together and, with HTP, the base sensitivity is automatically increased to ISO 200 to give more signal 'headroom'.

The alternative method of expanding the dynamic range is to use multi-shot HDR capture mode. As on the 5D III, there's also a set of four creative effects – called Art Standard, Art Vivid, Art Bold and Art Embossed – which can be applied and these vary the colour saturation, brightness, tonality and boldness of the outlines. The amount of exposure variation can be manually set to +/-1.0, +/-2.0 or +/-3.0 or automatically adjusted according to the brightness range detected in the scene. An auto image align function is also available along with the option of saving all the files or just the final merged HDR image.

The 5Ds also ticks the boxes for a multiple exposure facility, an intervalometer, manually adjustable noise reduction for both long exposures and high ISO settings, and an anti-flicker mode. This last feature (introduced on the 7D II) is designed to minimise exposure variations when shooting continuous sequences under fluorescent lighting. The inherent flickering of these light sources – related to the mains voltage frequency – is mostly invisible to the human eye, but it can make a considerable difference to exposures so the anti-flicker mode detects the frequency of the cycle and adjusts the shutter release timing between frames accordingly (or, when shooting just a single frame, adjusts the shutter's lag time).

The intervalometer can be set to record up to 99 frames – or switched to 'Unlimited' – over periods of up to 99 hours, 59 minutes and 59 seconds. Incidentally, the same maximum duration is also available for the 'bulb' exposure timer.

IN THE HAND

Similar in size and styling to the 5D Mark III, the 5Ds has a weather-sealed magnesium alloy bodyshell which has been reinforced in a number of areas to enhance rigidity and reduce internal vibrations. In particular, the area around the tripod mount has been significantly beefed up via an additional internal plate (a bunch of extra screws are the external give-away) so the camera is more solidly located. As there's no built-in WiFi, the entire bodyshell is metal and it feels incredibly well-built… much more so, surprisingly, than the 5D III or 7D II.

The control layout is classic Canon D-SLR with a lock-set main mode dial and large monochrome LCD read-out panel dominating the top deck. On the rear is a fixed 8.1 cm LCD monitor screen (with a resolution of 1.04 million dots) and Canon's combination of a 'multi-controller' joystick and its companion 'Quick Control' wheel which perform a wide variety of navigation and selection operations. The menu system is also the standard Canon fare so the chapters are colour-coded with entirely stand-alone pages within them (so continuous scrolling isn't available). Navigation is via a combination of the multi-controller and 'Quick Control' wheel), but as on the 7D II the once very lengthy Custom menu has been pared back and many of these items sensibly relocated to the main shooting menu. One idiosyncrasy is that it's necessary to first press the 'Set' button in order to bring up the sub-menus and settings.

There are no touch screen controls, but the 5Ds does have a 'Quick Control' display to provide direct access to a host of capture-related functions. This display is navigated conventionally via the multi-controller and settings are selected via the 'Quick Control' wheel. In live view, the 'Quick Control' function tiles are arranged down each side of the image display and are navigated in the same way. The live view screen can additionally be configured to include a real-time histogram (either brightness or RGB channels), a grid pattern (selected from a choice of three), a dual-axis level indicator, a set of status indicators or just the image alone. The level indicator is also available in the monitor screen when using the optical viewfinder. The finder's neat masking for shooting in the crop modes has already been mentioned, but also noteworthy are its superimposed displays (via a translucent LCD read-out panel)

Menu system is colour-coded, but each page is self-contained. A whole five-page menu (centre and right) is devoted to numerous set-ups for the autofocusing system.

which include the focus points, a dual-axis level indicator, guide grid and a range of status indicators. The level indicator now has both axes together in a single cross-type display – rather than separated in different parts of the frame – so it's much easier to gauge. Canon provides quite a bit of scope for customising the viewfinder display so it's possible to pick and choose which elements are included.

The review/replay screens include a highlight alert, basic capture info or a thumbnail image with either a luminance histogram or a set of RGB histograms. The playback modes include pages of four, nine, 36 or 100 thumbnails, zooming up to 16x and a slide show function with adjustable image display times (plus a repeat function). As on the 7D II, the slide show can be programmed to display selected images – for example, according to the date of capture, the folder name or a star rating.

SPEED AND PERFORMANCE

Loaded with our Lexar Professional 64 GB SDXC 600x reference memory card, the EOS 5Ds captured a sequence of 25 JPEG/large/fine frames in 4.634 seconds dead which represents a shooting speed of 5.39 fps. This is slightly better than Canon's quoted 5.0 fps and the test file size averaged around 21 MB. Impressively, the buffer emptied this 500 MB worth of data very quickly. It's only marginally slower when handling the bigger RAW files.

Given the 5Ds certainly isn't designed to be a sports camera – it's hard to see 50 MP really being needed for this application – its speed capabilities are more than adequate… and it really wasn't all that long ago when 5.0 fps was considered fast.

In terms of the imaging performance, the resolution is obviously the big deal, but it became evident during testing that making the most of it really does require a very disciplined approach to shooting. In other words, the camera needs to be on a tripod and, if the subject matter allows, the mirror lock-up delay employed. Do all this, and the rewards are truly exceptional levels of crisply-defined fine details complimented with the faithful reproduction of subtle tonal gradations. Whereas we'd typically evaluate test images for sharpness and noise at 100 percent, with the 5Ds this needs to be done at 200 percent. Particularly commendable is that everything holds together exceptionally well across the native sensitivity range so even images captured at ISO 6400 are still superbly detailed and only a small amount of luminance noise is evident in areas of continuous tone (but again only after significant enlargement).

Using the Fine Detail 'Picture Style' provided some additional edge enhancement, giving a little more visual 'pop' without actually looking artificial.

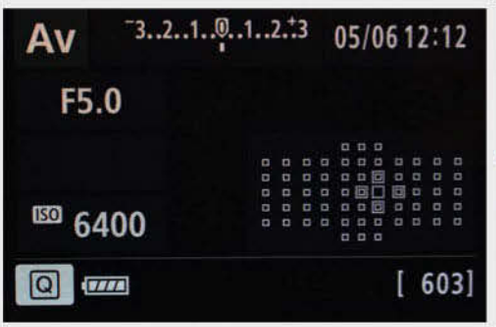
The dynamic range is good but not exceptional with JPEG capture and, not surprisingly, a whole lot better with RAW capture which is largely maintained after these files are converted to TIFFs. With its larger pixels, the Pentax 645Z – logically, the 5Ds's closest competitor in imaging performance terms – does better in terms of both dynamic range and the signal-to-noise ratio at the lower ISO settings, but the Canon catches up dramatically at the higher sensitivity settings especially with JPEG capture, beating all comers from among its full-35mm sensor rivals.

Subjectively, the EOS 5Ds easily beats the Nikon D810 for definition detailing and dynamic range at ISO 100 – a comparison we can make since our speed test images are always of the same scene – and it's safe to conclude it performs better at the very high ISOs of 3200 and 6400 thanks to carefully balanced noise reduction techniques which result in a negligible loss of sharpness.

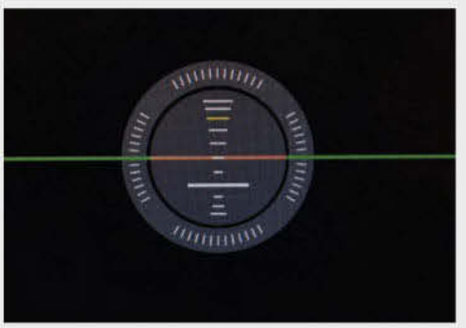
THE VERDICT

All hail the new king of the full-35mm format D-SLRs. Fifty megapixels is a significant increase over 36 and it shows, but more importantly Canon has effectively dealt with the issues associated with having smaller pixels so the noise characteristics, in particular, are something of a revelation, but also – albeit to a lesser extent – extent is the dynamic range. Consequently, the

Info display in the monitor screen also serves as a 'Quick Control' screen, enabling quick and easy access to a wide selection of capture-related functions.



The alternate info screen includes AF points. Single point selection with a four-point expansion is shown here.



Dual-axis level display is available in the monitor screen, live view image and viewfinder (via a translucent LCD panel overlay).

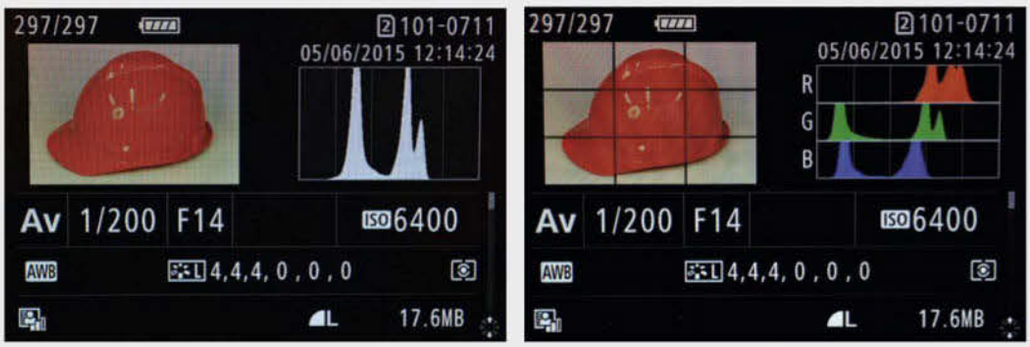


Image review screens include a thumbnail with either a brightness histogram or a set of RGB histograms (preset in the Replay Menu).

The live view screen can include just a grid guide (selected from a choice of three) or additional components such as the dual-axis level indicator and various status displays.

marked increases in detailing and definition are delivered without some of the usual penalties… including, in the case of moving up to digital medium format, a bigger, bulkier and pricier camera. It's akin to going on an all-chocolate diet and not putting on any weight!

However, you don't get off entirely scot free. The EOS 5Ds still demands pretty much the same operational disciplines as a 50 MP digital medium format camera, primarily to deal with any of the external factors which have the potential to diminish sharpness. Make the effort though, and this camera will reward you handsomely with a superlative image quality that's a joy to behold. And we have never seen this combination of performance, portability and price – at least in the digital era – before.

So, back to the question we asked at the start of this article… do you actually need 50 megapixels of resolution? For many, the reality is simply no, but if you're prepared to let your heart rule your head, the answer is a resounding yes!

VITAL STATISTICS

CANON EOS 5Ds $4999

body only, estimated average street price

Type: Enthusiast-level/semi-professional digital SLR with Canon EF bayonet lens mount.
Focusing: Automatic via 61-point wide-area system using phase-detection type CMOS sensor. 41 points are cross-type arrays at f4.0, five points are dual cross-type arrays at f2.8, centre point is cross-type array at f8.0. Focus points may be selected manually or automatically (9, 15 or 61 points selectable), 'Zone AF' and 'Large Zone AF'. AF point expansion (4 points – one up/down/left/right; or 8 fully surrounding points). One-shot and continuous (Predictive AI Servo) modes with auto/manual switching. Continuous AF with predictive function and acceleration/deceleration tracking and adjustable tracking sensitivity. Sensitivity range is EV -2.0 - 18 (f2.8, ISO 100). AF assist only provided by accessory flashes. AF micro-adjustment for up to 40 individual lenses. Contrast-detection AF in live view and video modes.
Metering: Via 150,000 pixels 'RGB+IR' sensor. 252-zones evaluative, selective area (13% of image area), spot (6.1%), centre-weighted average and E-TTL II auto flash. Metering range is EV 0 to 20 (50mm/f1.4/ISO 100).
Exposure Modes: Continuously-variable program with shift, shutter-priority auto, aperture-priority auto, 'Scene Intelligent Auto', metered manual, E-TTL II auto flash.
Shutter: Electronically-controlled vertical travel focal plane type, 30-1/8000 second plus 'B'. Flash sync to 1/200 second. Exposure compensation up to +/-5.0 EV in either ½ or 1/3 stop increments.
Flash: No built-in flash. External flash units sync via a hotshoe or PC terminal.
Viewfinder: Coverage = 100% vertical/horizontal. Magnification = 0.71x (50mm lens at infinity). LCD displays and LED focus point indicators. Fixed focusing screen. Eyepiece strength adjustment provided.
Additional Features: Magnesium alloy bodyshell with weather-proofing, auto exposure bracketing (over two, three, five or seven frames), depth-of-field preview, AE lock, dual-mode self-timer (two and ten second delays), mirror lock-up (adjustable time delays from 1/8 to 2.0 seconds), audible signals, wireless (IR) remote control, wired remote control, silent shutter mode, 16 custom functions.

DIGITAL SECTION

Sensor: 53.0 million pixels CMOS with 36.0x24.0 mm area and 3:2 aspect ratio. Sensitivity equivalent to ISO 100-6400 (expandable to ISO 50 and 12,800).
Focal Length Increase: None.
Formats/Resolution: Two JPEG compression settings plus RAW lossless compression. Six resolution settings at 3:2; 8688x5792, 7680x5120, 5760x3840, 4320x2880, 1920x1280 and 720x480 pixels. Six resolution settings at 1.3x crop; 6758x4512, 6016x4000, 4512x3008, 3376x2256, 1920x1280 and 720x480 pixels. Six resolution settings at 1.6x crop; 5424x3616, 4800x3200, 3616x2408, 2704x1808, 1920x1080 and 720x408 pixels. Six resolution settings at 1:1 aspect ratio; 5792x5792, 5120x5120, 3840x3840, 2880x2880, 1280x1280 and 480x480pixels. 4:3 and 16:9 aspect ratio settings also available. RAW images are captured at 8688x5792, 6480x4320 and 4320x2880 pixels. 42-bit RGB colour. RAW+JPEG capture is possible.
Video Recording: Full HD = 1920x1080 pixels at 25 or 24 fps (progressive) and 16:9 aspect ratio. HD = 1280x720 pixels at 50 fps and 16:9 aspect ratio. SD = 640x480 pixels at 25 fps and 4:3. MPEG 4 AVC/H .264 compression (ALL-I or IPB methods). ALL-I compression requires UHS-I speed memory card). Mono sound recording with adjustable levels and wind filter. Stereo microphone input provided. Time code support. Clip duration limited to 29 minutes and 59 seconds.
Recording Media: Dual slots for SD/SDHC/SDXC memory cards with UHS-I support, and CompactFlash memory cards with UDMA-7 support.
Continuous Shooting: Up to 510 frames at 5.0 fps in JPEG/large/fine mode, up to 14 frames in RAW mode.
White Balance: Auto/manual with six presets and one custom setting, white balance bracketing (two, three, five or seven frames), white balance correction (blue-to-amber and/or green-to-magenta) and manual colour temperature setting (2500-10,000 degrees Kelvin). Auto correction can be set to either Ambience Priority or White Priority.
Interfaces: USB 3.0/AV, mini HDMI (Type C), 3.5 mm stereo audio input.
Additional Digital Features: Live view functions (with contrast-detection AF), built-in sensor cleaning, 8.1 cm fixed LCD monitor (1.04 megadots), sRGB or Adobe RGB colour spaces, eight 'Picture Style' modes (Auto, Standard, Portrait, Landscape, Fine Detail, Neutral, Faithful and Monochrome), three user-definable 'Picture Styles', six adjustable 'Picture Style' parameters (Sharpness – Strength, Sharpness – Fineness, Sharpness - Threshold, Contrast, Saturation and Colour Tone), B&W filter effects (Yellow, Orange, Red, Green), B&W toning effects (Sepia, Blue, Purple, Green), grid guides (choice of three), highlight warning, 'Exposure Simulation' display, dual-axis electronic level display, long exposure noise reduction (Auto, On, Off), high ISO noise reduction (Low, Standard, Strong, Multi-Shot, Off), 'Highlight Tone Priority' dynamic range expansion processing (On, Off), 'Auto Lighting Optimiser' settings (Low, Standard, High, Off), in-camera lens abberation correction ('Peripheral Illumination' and 'Chromatic Aberration), multiple exposure facility (up to nine with Additive/Average/Bright/Dark exposure adjustments), multi-shot HDR capture (Auto, +/-1.0, +/-2.0, +/-3.0 EV) with auto align and four effects (Art Standard, Art Vivid, Art Bold, Art Embossed), anti-flicker mode, intervalometer (up to 99 shots or unlimited), in-camera RAW-to-JPEG conversion (ten parameters), adjustable image display time, auto playback, auto image rotation, 4/9/36/100 thumbnail displays, zoom playback (up to 16x), insert copyright information, auto power-off (adjustable duration), DPOF and PictBridge compliant. May be fitted with optional Wireless File Transmitter WFT-E7 II or GP-E2 GPS receiver.
Power: One rechargeable 7.2 volt 1865 mAh lithium-ion battery pack (LP-E6N type). Optional BG-E11 battery grip can be fitted and accepts six AA-size batteries or two LP-E6 packs.
Dimensions (WxHxD): body only = 152.0x116.4x76.4 mm.
Weight: body only = 845 grams (without battery pack or memory card).
Price: $4999 body only (estimated average street price).
Distributor: Canon Australia Pty Ltd, telephone 1800 021 167 or visit www.canon.com.au

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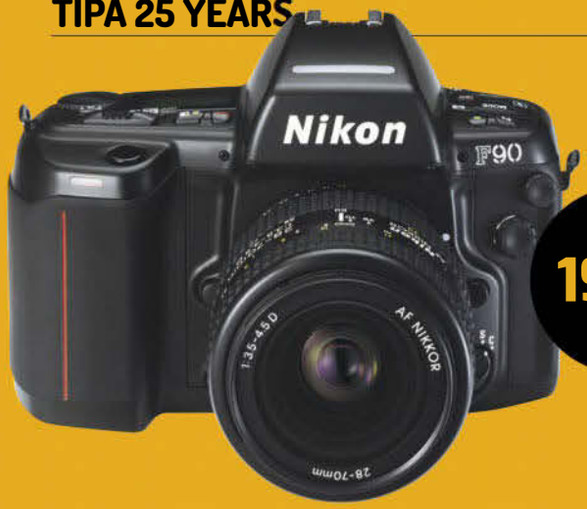


1993

TIPA CELEBRATES 25 YEARS

A PARALLEL STORY OF PHOTOGRAPHY

It's a quarter of a century since the Technical Image Press Association was formed to foster co-operation between photography magazines and promote higher editorial standards, but the industry has comprehensively changed over this time. Nowhere has this been more evident than in the prestigious annual TIPA Awards which, over these years, very much reflect the changes in technologies, categories and winners.

The prestigious TIPA Awards trophy is awarded annually in 40 categories of imaging products. The first TIPA Awards were held in 1992 and comprised just five categories. The subsequent increase reflects how much photography has changed over the last quarter of a century.

The story of TIPA – the Technical Image Press Association – is also the story of photography. Since 1991, the *camera obscura* – which is our shared passion – has not known an evolution, but a real revolution, not only technically, but also aesthetically and culturally.

The role of the image in our society today has nothing to do with that which was the case in 1991. And, as photography is a 'technical' and industrial art, by rewarding each year the best 'photographic tools', TIPA's awards reflect the incredible upheaval that was the change from the analogue image to the digital image. Simply by diving into the archives of the TIPA Awards you find a world that now seems distant, but yet is only a quarter of a century ago.

Photography is a world in constant change... In 1991, at its first general assembly, the association gave only five awards (compared to the 40 categories covered today). The winning brands then were Sanyo, Kodak, Fujifilm, Kyocera-Contax and Agfa.

Of these brands, only Fujifilm remains a leading player in photography. And, if we take the second set of awards from 1992, we also see an award for Konica-Minolta, another major player that went missing in the digital age!

Few industries have been so disrupted over a period 25 years than photography and, reading the lists of the different TIPA Awards over this time, three important trends are evident.

Firstly, photography has become a full and complex universe where the image exists in many different forms. With film it was enough to have ten or 20 categories to cover the entire market. With digital, photography comes with

◀ The editors of the TIPA member magazines pictured at the judging of the 2015 TIPA Awards, held in Dubai. TIPA's members now span five continents and include publications in Germany, France, Italy, Greece, Spain, Hungary, The Netherlands, United Kingdom, Australia, Brazil, South Africa, India, China, Canada and the USA.

so many media and tools that TIPA has found it necessary to establish 40 categories.

Secondly, if some brands have not really made the transition to digital, the great historical leaders in cameras did in the end keep their leadership. So Canon and Nikon still dominate the market for reflex cameras. In 25 years, Canon has collected no less than 69 awards, and Nikon 44 awards. Today, even though the imaging world has changed so dramatically, 'historical' brands such as Canon, Nikon, Leica, Fujifilm, Pentax, Olympus, Sigma and Tamron are still at the forefront.

Finally, in addition, the photographic sector has been revitalised by the arrival of large prestigious electronic brands that have chosen to enter this market. Of course, here we think of Sony which won its first TIPA Award in 1994 for a camcorder and then had to wait until 2003 to win in the category of superzoom cameras for the DSC-V1, or Panasonic which received its first TIPA award in 1992 for a camcorder before waiting until 2005 to receive a photographic award with the Lumix FZ20. In the area of accessories and peripherals, we could also mention many brands that have entered the field of photography at the time when the sensors replaced film. And their presence as winners of TIPA awards indicates the quality of their products.

The Whole Picture

When documenting trends in imaging technology, the evolution of the TIPA Awards has tracked the successive technological innovations. No important innovation has been forgotten by successive awards and, interestingly, it has often been on the side of accessories or peripherals that the greatest surprises have occurred.

This is why TIPA has always wanted to address the entire photographic sphere by opening its awards to software, printers, monitors, storage media, inkjet papers, scanners, etc… all areas which may be less spectacular than either D-SLRs or CSCs, but which are equally important for those who practice photography every day.

Of course, it is also important to mention the inclusion of lenses in the TIPA Awards. Today they have become a key economic sector as consumers continue to invest in newer and better lenses, recognising that these are central to the art of photography. The lens category first appeared in the third TIPA Awards in 1994, rewarding the Sigma 17-35mm f2.8-4.0 EX HSM Aspherical zoom. Subsequently, to fully cover this market and enable the comparison of truly similar products, TIPA's technical committee has increased the number of categories devoted to lenses. With the variety of imaging sensor sizes, lens ranges have further developed and multiplied. TIPA immediately reflected this in a further re-evaluation of its categories by creating different product families. The goal is always the same, namely to faithfully reflect the products offered by manufacturers to allow consumers to choose the best products with total confidence.

Into The Digital Age

For all enthusiasts, whether professional or amateur, a feature of the TIPA Awards is bringing together the 'pro' and 'amateur' worlds under the same umbrella and thus allowing everyone to position themselves where they feel most comfortable.

If this distinction is sometimes difficult to establish, it remains relevant to reward products that are aimed at different target markets. The association includes both consumer-orientated magazines and publications targeted at different imaging professionals. This is why, in 1994, a professional product award was first introduced and was won by a digital capture back from the American company Dicomed.

This choice also shows that, from its creation, TIPA has been interested in the digital world, although back then the technology was

Between the Nikon F90 (winner in 1993) and the D5500 (winner in 2015), there is no longer much in common except belonging to a brand that continues to bring together the family of Nikon enthusiasts over and above the technologies.

"The goal is always the same, namely to faithfully reflect the products offered by manufacturers to allow consumers to choose the best products with total confidence.

2015

still fairly marginal. Even in those very first awards back in 1991, the one for Kodak didn't go to a film product, but to the company's Photo CD system. Today who remembers that Kodak was the pioneer of storing photographs on CD? Yet, in all honesty, in 1991 no one predicted that digital imaging would replace film so quickly and comprehensively.

Reviewing the sets of award winners from the 2000s, the rapid inroad of digital imaging products is clearly evident. In 2000 at the turn of the millennium, five prizes out of the 15 awarded (i.e. 33 percent) related to digital imaging products. In 2001, nine awards were given to digital products. Then the phenomenon gently accelerates during the great transition years. In 2004, 20 awards were awarded to digital products and, in 2005, the Nikon F6 was the last of the great film SLR cameras to win an award. Only the Best Film category remained until 2009 with that award going to Kodak's Ektar 100 colour negative film... from then on the TIPA Awards became 100 percent digital.

Industry Involvement

As an active and committed international association, the activity of TIPA is not only summed up by the lists of product design prizes awarded.

By grouping around 30 magazines – initially all European based, but now fully global including Australia, Brazil, South Africa, India, China, Canada and the USA – the association has become a major player in the photographic industry. Numerous visits to factories and meetings with the leaders of major companies mean that TIPA is a recognised interlocutor that is listened to. The annual awards ceremony, alternatively held at Photokina in Cologne and in Tokyo where most of the major photographic brands are based, is always an event to look forward to.

TIPA also likes to make the most of its role by contributing to any important debate concerning the industry. For instance, the association has tackled the modernisation of some photographic concepts carried forward from the age of film which today can be difficult for many newer photographers to understand. In the same direction, when a new category of intermediate device was created – namely, the compact cameras with interchangeable lenses – and there was confusion over how these products would be described, the association proposed the clear designation 'Compact System Camera' (CSC for short) which has subsequently been adopted by many brands.

All these initiatives and activities are possible because the association is based on a network of recognised and respected magazines where each title reflects its readers and the 'national' vision of photography. The mix of experiences, cultures and perspectives make up the richness of this global organisation that is always striving to be fair.

To correctly expose a photograph, it is necessary to find a balance between an aperture setting and exposure time or shutter speed. In 2015 and beyond, TIPA must also find a balance between being aware of new contemporary practices (which sometimes challenge our photographic habits) and a photographic culture, both technical and aesthetic, which is based on these 25 years of experience.

Because the photograph was not born with the smartphone or selfie, it is drawing on its history that we also find the means to understand the present and look to the future… importantly, beyond the fleeting influences of fashion.

For more information about TIPA visit **www.tipa.com**

1992

THOMAS GERWERS

The chairman of TIPA since 2008 and editor of the German magazine ProfiFoto, Thomas Gerwers gives his views on the association's activities and objectives.

You have been the chairman of TIPA since 2008. What is the main purpose of the association today? Are the awards more important for the brands or for the readers of the magazines?

First of all, the TIPA Awards give orientation to consumers. A TIPA Award indicates the excellence of a product in its field. At the same time it is an honour for the manufacturer to be awarded. Remember, each year there are hundreds of new imaging products, but only 40 are judged the best in their specific field. For TIPA as an association of photo and imaging magazines, the main purpose in the year of its anniversary is to make consumers clearly understand why it makes sense to take a camera when the picture matters, that photography is more than taking snapshots with a smartphone.

The photographic world has changed a lot since 1991; digital was a revolution. How do you succeed in keeping the association alive and more successful year after year?

Since I have been the chairman of TIPA the association has globalised. Since 2008 we accept the best photo- and imaging magazines not only from Europe – where TIPA started – but from all over the world. We carefully select

> ***The next step for TIPA as an association is to develop its membership in the best direction possible in order to stay the most important organisation of photography and imaging experts worldwide.***
>
> **THOMAS GERWERS,** *CHAIRMAN, TIPA.*

suitable new members and aim to attract the best of the leading photo magazines in order to build the best expertise in photography. And as innovation never stops, the development of our awards goes further, with new and adapted categories each year. After 25 years, the TIPA logo has a worldwide reputation, based on the integrity of TIPAs decisions, which is the true basis of its success.

How do you see the future of photography and of TIPA? What is the next step for the association?

Today people shoot more pictures than ever before and this development will go on, so photography has a bright future. As a technical medium, the process of taking pictures involves equipment, and TIPA guides photographers when it comes to the question, which are the 'best of the best'? Photographic technology has always been in transition, and TIPA needs to find the answers to the right questions. The editors of the TIPA member magazines know very well what photographers are asking for, they have an in-depth overview about trends and innovations, so their expertise is of great value. The next step for TIPA as an association is to develop its membership in the best direction possible in order to stay the most important organisation of photography and imaging experts worldwide.

JUAN VARELA

Founder member of TIPA and its chairman until 2008, Juan Varela explains how the association came into being.

Why did you decide, 25 years ago, to create a new photographic association called TIPA?

During the 1990 Photokina there were several meetings of editors and publishers interested in founding and becoming members of a new association of photo magazines. Francisco Torres, editor of the now disappeared *Foto Ventas* magazine, was very active and he took care of the organisation at the founding meeting in Paris in April 1991. Twelve magazines attended this meeting from several countries, including France, Germany, Italy, the Netherlands, Spain, Sweden and the UK.

In Paris, we agreed, in addition to the official name, on three important principles of the Technical Image Press Association.

Firstly, TIPA would be open to all European photo magazines in print, which are independent of the product manufacturers.

Secondly, the association would be a non-profit institution that would spend any income collected on promoting photography, the photo industry and the value of the TIPA awards.

Thirdly, the editors – representing their magazines in TIPA – would vote each year for the best products launched into the market during the last twelve months.

You were chairman of the association for many years. Why do you think TIPA was a success… and is still a success?

The TIPA annual awards were always going to be done in a totally independent way. Then, slowly but surely, year after year, the companies and retailers started to use the TIPA awards logo for their advertising and promotions. From its side, TIPA did more and more activities, such as the readers' surveys, non-sponsored manufacturing site and cultural visits, product tests, advertising campaigns and photo contests.

During these years, we saw many photo companies either disappear while many companies new to us – mainly from the consumer electronics and the software markets – came to play a more and more important role in our industry. I think that TIPA understood the changes well and took the right decisions to adapt to the times. Later on, under the new chairman, TIPA became a worldwide organisation, as the geographical frontiers no longer made sense in a connected world.

Which is your best personal memory?

My best memory from TIPA is the relations with members. TIPA also opened for me, as well as for other members, the chance to meet many European and worldwide colleagues, and also to visit their countries and to know first-hand their local markets. Now that I'm no longer involved in the running of the association, I feel proud to see TIPA as a leading worldwide media association in the imaging business.

From the Canon EOS 100 (winner in 1992) to the EOS 7D Mark II (released in 2014), the technical change is radical, but both cameras maintain kinship ties and a compatible lens mount.

> ***Now that I'm no longer involved in the running of the association, I feel proud to see TIPA as a leading worldwide media association in the imaging business.***
>
> **JUAN VARELA,**
> *FOUNDER MEMBER & TIPA CHAIRMAN UNTIL 2008.*

REPORT BY TREVERN DAWES

EPSON
SURECOLOR SC-P600

SURE THING

Epson kicks off a new generation of pigmented-ink photo printers under the "SureColor" brand. Trevern Dawes puts the A3+ model through its paces.

While new digital cameras arrive at a rapid rate, it can be several years between an A3+ printer and its updated model. After four years, the Epson SureColor SC-P600 is the successor to the venerable Stylus Pro R3000.

The new SC-P600 (the "P", by the way, stands for "Photo") is essentially the same as the out-going Stylus Pro R3000, but comes in a revised casing and has a new inkset, extended connections to remote devices and a 6.8 cm LCD tilt-adjustable touch screen to control most functions. As a 'prosumer' printer, it is the entry-level A3+ pigment model in the SureColor range which is progressively going to replace the Stylus Pro models. However, the word "entry" could be an

inappropriate classification as this printer is by no means basic.

We might concede that inkjet printers have reached a plateau of image realism where little else can be achieved apart from the usual consumer wish list of cheaper prices for both printer and inks combined with faster speed and larger capacity cartridges. However, any improvements are undoubtedly welcome.

The new UltraChrome HD pigment inkset (coded as a T7601 to T7609) comprises five colours (Cyan, Light Cyan, Yellow, Vivid Magenta and Vivid Light Magenta) and four blacks (Photo Black, Matte Black, Light Black and Light Black). The Photo Black and Matte Black share a channel and automatically interchange according to whatever media is selected to have eight inks running.

The D-Max of 2.84 is claimed by Epson to be the darkest for any pigment printer. In association with the new colourants, new resin encapsulation and high resolution, the print quality with pigments reaches a new peak. For extra measure, the longevity ratings are expected to significantly increase but we'll need to await confirmation from Wilhelm Research.

IF THE SC-P600 DOES A CREDITABLE JOB WITH GLOSS AND SEMI-GLOSS MEDIA, IT'S AT ITS VERY BEST WITH MATTE AND FINE-ART PAPERS. THE DEPTH OF THE BLACK HELPS TO ANCHOR THE COLOURS.

The connections with Apple AirPrint and Google Cloud Print plus WiFi Direct (for smartphones, tablets and PCs) will appeal to the technically minded, but is likely to have little bearing when it comes down to making exhibition quality display prints.

DESCRIPTION

The sleek, black SureColor SC-P600 has a sturdy construction and is as elegant as a desktop printer can be. Weighing 15 kilograms, it's easy enough to position on a sturdy desk and comfortable enough to carry over short distances. The top area is ideal for temporary placement of papers.

The LCD touch screen swivels out to 45 degrees. The top left button is a blank while the other three are for power on/off, back to previous menu, and home. The LCD menu attends to most functions, including media selection, WiFi connection, CD/DVD label printing, black ink selection and a low ink warning. Via 'Administration' and 'Print Status Sheet' there is even a usage history to report on the date of first usage, the number of prints and the A4 equivalent prints.

The default for sleep mode is three minutes. If no operation occurs during that period the printer goes to sleep but is awakened by any new action. The duration can be altered from one to 240 seconds via the LCD menu. Power supply may be set to 'Off' to leave the printer on continually or to a designated time.

Three paper feed systems are available, along with a CD/DVD tray. The auto sheet feeder attends to most printing operations, the front loader is designed for fine-art media up to 1.3 millimetres in thickness and heavyweight media, while a roll feeder can be attached at the rear.

General operation is relatively quiet apart from an occasional whir as the printer sorts out its routines. From time to time the printer will stop to have a 'big think', sometimes for a minute or so, to check everything and will then carry on.

IN THE BOX

The sturdy packing box contains the printer, 'Getting Started' instructions, a software disc, the set of ink cartridges, the CD/DVD printing tray, roll paper supports, a 1.8-metre USB cable and a power cable.

Everything is well presented including the cartridges being in the right order to match positions in the printer. The accessory box should actually be retained to store the transport lock, CD and spare cartridges.

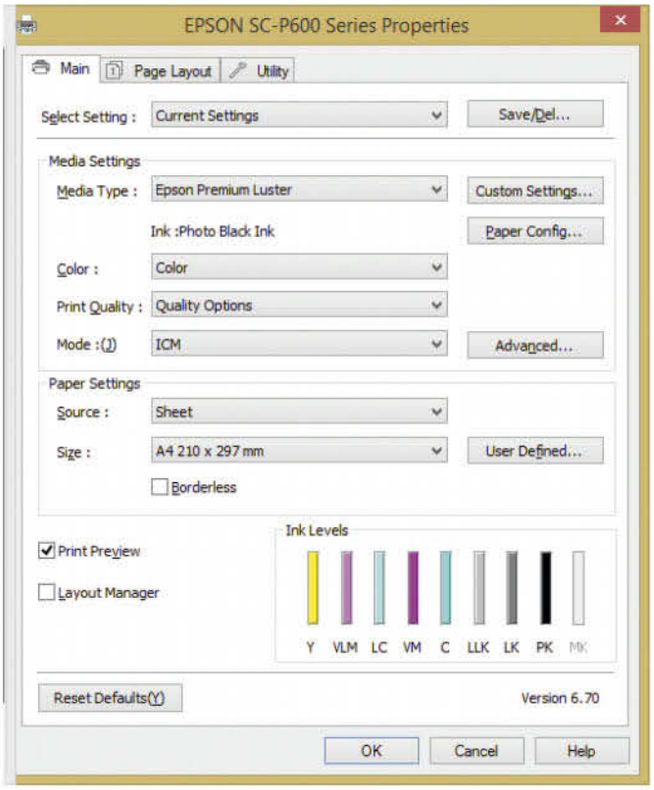
A 125-page PDF manual may be downloaded from the Epson Website. Take the trouble to read the manual to become familiar with all the features. Alas, the days of a hardcopy manual to accompany a printer may have disappeared forever.

It takes about 40 minutes to remove the printer from the box, remove all the protective tape and the plastic orange transport lock, insert the ink cartridges and load the software. The transport lock should be retained and re-inserted

The angled control panel/screen provides useful information and access to the printer's features.


The nine-pigment ink cartridges. Each cartridge contains 25.9 millilitres of ink.

The Epson Print CD program allows CD/DVD labels and jackets to be produced.



The 'Main' panel is where all the parameters are established. Regular settings can be saved for quick retrieval.

and taped securely if the printer is to be moved.

The step-by-step set-up procedure is easy to follow and begins by turning the printer on. After pressing to confirm 'English' is the default language (overlook this critical step and the inks will not charge) the cartridge compartment is opened. Each cartridge is given a gentle shake and yellow tape removed from ink outlets before insertion into the dedicated position. When the lid is closed, the printer will take about ten minutes of whirring and general noise to charge the print head. In this initial priming, a small amount of ink is used to run ink through the lines. The screen will then advise to connect the USB cable and install the software.

Upon completion, the default will be for the Photo Black ink. Consequently, to avoid any ink loss immediately by a changeover, it's a good idea to start out with gloss or semi-gloss media.

PAPER HANDLING

The auto sheet mechanism takes hold of the paper, pushes it up and down to set the alignment and then proceeds. Accurate placement of paper in the auto sheet feeder as single sheets (or as stacked, fanned paper) is important, otherwise the printer may not pick up the paper or will take it straight through, add a dent and announce the failure with some beeps and a 'Reload' message.

The review printer proved to be inconsistent with the auto paper feeder, one day working perfectly and the next day causing frustration. Hopefully, this was just a glitch in this particular printer and not a common problem.

The front feed for fine-art and heavyweight papers requires a tray to be lowered and the rear output support platform opened. Paper is positioned and 'Load' pressed on the touch screen. The paper is drawn through to the rear outlet and, after a short wait, the printer instructs the tray to be returned to its normal position. The print file is then sent. Unlike some other printers, there are no margin restrictions applied.

The paper roll facility is essential for long banners, but for a metre long panorama the auto paper feeder is fine. Epson has ten-metre rolls of glossy (255 gsm) and semi-gloss (251 gsm) paper. Needless to say, it's important to ensure adequate ink supply and preferably run a small test piece before committing. There is no auto paper cutter, but a faint line is printed to enable scissors to be used.

The roll paper facility allows banner prints up to 15 metres long. The 'User Defined' setting allows widths from 89 to 329 millimetres and lengths from 89 to 15,000 millimetres. Curiously, the user manual indicates a maximum roll length of 3276.7 millimetres, but only 1117.6 millimetres for Mac users.

MAIN PANEL

The 'Main' panel is the hub for printing. 'Media Type' has a listing for five categories with further options. These are 'Photo Paper' (4), 'Matte Paper' (2), 'Fine Art Paper' (3), 'Plain Paper' (1) and 'CD/DVD' (2).

The range of 'Print Quality' is determined by the media type. This list covers 'Speed', 'Quality', 'Max. Quality' and 'Quality Options'. The latter cover resolution and the choice of having 'High Speed' printing set to either 'Off' or 'On'.

The modes of colour management include 'Epson Standard (sRGB)', 'Adobe RGB', 'PhotoEnhance', 'ICM' and 'Off – No Colour Management'. The first two basic settings simply lock into the colour space of the image while 'ICM' follows through to ICC profiles. Although each approach produced satisfactory results, most Photoshop enthusiasts can opt for 'Printer Manages Colours' and lock in ICM values, or 'Let Photoshop Manages Colours' with the 'Mode' set to 'Off – No Colour Adjustment'.

The 'Size' menu lists standard paper sizes and includes a 'User Defined' setting where a custom size can be established and saved. A right-click over any feature will bring up 'Help' and further details.

On the Epson Website there is an excellent RGB guide to colour printing compiled by Australia's Training and Application Specialist. Simply search on "RGB Print Guide – Epson Australia".

GLOSS AND SEMI-GLOSS

Test prints made on gloss and semi-gloss media had impact and vibrance approaching that of the dye-based printers, but also exhibited gloss differential (i.e. seeing the gloss surface of the paper where no ink resides). This has always been a problem with pigmented inks used on gloss or semi-gloss media. The only remedy is to use printers with a gloss optimiser cartridge, such as the Epson Stylus Pro 2000. The only disadvantage here is a slight dulling down of the surface. Prints made on papers like Epson Traditional Photo or Innova Fibraprint Gloss were substantial in weight and image quality.

Epson does offer a useful piece of advice for reducing the gloss differential on black and white prints. In the 'Main' panel and with 'Advanced B&W' selected, proceed to 'Advanced' and change the 'Off' default for 'Highlight Optical Shift' to 'On'. This adds extra Light Light Black dots to the clear areas.

MATTE PRINTS

If the SC-P600 does a creditable job with gloss and semi-gloss media, it's at its very best with matte and fine-art papers. The depth of the black helps to anchor the colours.

The first test print was an A4 size B&W made on the Epson Fine Art Velvet paper. As a fine-art paper, this required the use

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of the front feeder. Maximum resolution was set for the B&W print and it took nine minutes and 45 seconds, but the result brought a 'wow' response. The front loader is super fussy about accurate paper alignment so if a repeated 'Askew' message appears, use the LCD screen to proceed to 'Paper Setting' and turn 'Paper Skew Check' to 'Off'.

An A4 colour print – made with the 'Quality' setting – took 2:15 minutes. Epson's Hot Press Bright has been a favourite media and for the A4 test print there was no hesitation in using the utmost resolution. There's no point in settling for compromises when using a top printer and top paper combination. It took another 9:45 minutes, but produced another outstanding result.

Several prints were produced on A3 size Innova Fibraprint 280 gsm matte paper with 300x200 mm images. The profile for Epson UltraSmooth Fine Art Paper was initially adopted. At 'Quality', each print took 2:15 minutes via the front paper feed. The results were a touch yellow, but by using Adobe RGB mode (to match the print files) and taking out -5 Yellow, the colour was then spot on. This proved to be a most satisfactory arrangement without the need to chase down or create a custom ICC profile. A portfolio of prints on A3 could be comfortably produced at about six per hour via the front feed.

The ability to handle other (i.e. non-Epson) media was demonstrated with two A3+ sheets of Lumijet Radiant White 290 gsm (Hahnemühle) fine-art ink jet paper. At 'Quality, level 4' and with the profile for 'Watercolor Paper – Radiant White', it took four minutes with 'High Speed' switched on and nine minutes with 'High Speed' off. The results were most pleasing.

A custom ICC profile might extract a few more points, but getting a good result from a canned profile is most encouraging. The general recommendation is to work with 'High Speed' switched off to ensure better detail and shadow density. Doubling the print time is not an issue when the aim is quality and the print size is A3+.

Ascertaining the differences in print quality between the SC-P600 and Stylus Pro R3000 (or, indeed, any of Canon's pigmented ink printers) using similar images, papers and appropriate ICC profiles without scientific apparatus can be difficult. For those who dwell on the finest of technicalities the Internet can provide precise data for D-Max, gamut, etc. comparisons. The rest of us tend to judge everything by eye.

B&W PRINTING

Black and white enthusiasts are fully catered for, with the scope for either neutral results or warm, cool or sepia tonings via the Epson Advanced Black and White (ABW) control carried forward from the Stylus R3000. Apart from the gloss or matte black inks, the Light Black and Light Light Black combine to provide extensive tonality.

Devotees of monochrome will undoubtedly experiment to find the optimum settings for favourite papers and may find that assigning RGB mode to print files will deliver better outcomes than printing the same file converted to greyscale.

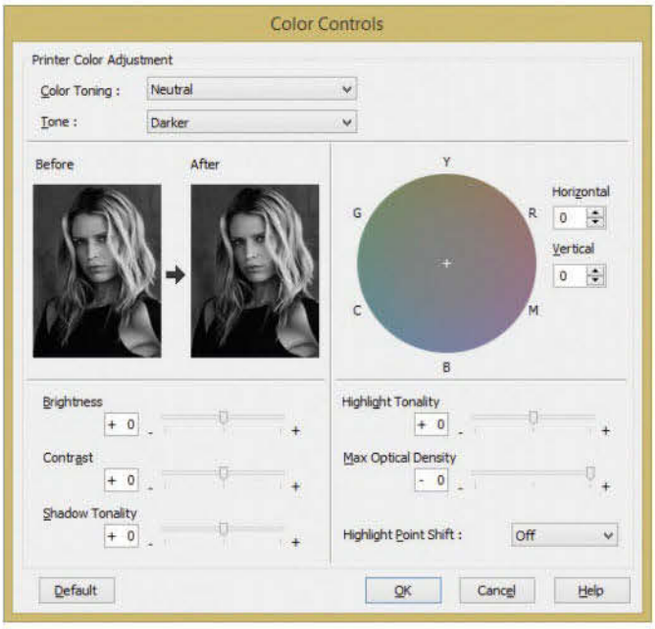
Photo Black and Matte share the same line and interchange automatically. When Photo Black is swapped to Matte Black it takes 1.5 minutes and uses one millilitre of ink, while going from Matte Black to Photo Black takes 3.5 minute and consumes 3.0 millimetres.

However, the 'Normal' default changeover mode can be altered, via the LCD screen, to 'Save' mode for one millilitres spillage each way. The path is 'System Administration', 'Printer Settings' and 'Black Ink Change Settings'.

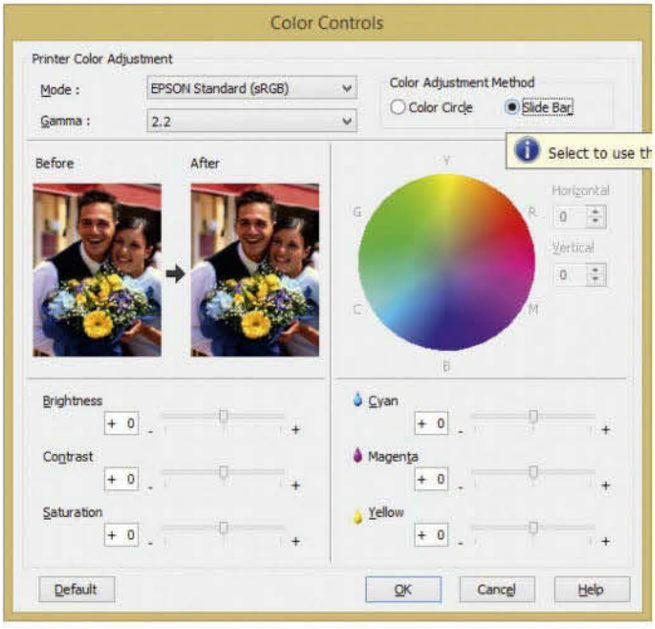
Although there is a small saving in ink, Epson has taken a cautious approach whereby 'Normal' ensures a clean changeover. 'Save' can involve some risk of contamination. Epson at least provides the option. The 'Save Ink' setting is not mentioned in the manual. As regular changeover of black inks will result in wastage of costly ink, printing sessions need to be well organised.

PANORAMIC PRINTS

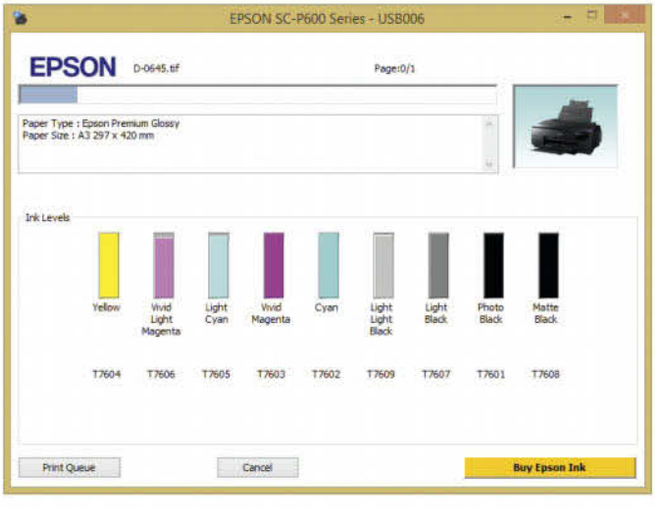
Paper rolls are the ideal way to produce banners or panoramic prints. However, the auto sheet feeder can still be used for long prints provided the paper is properly supported and the leading edge cut square for correct alignment (pull

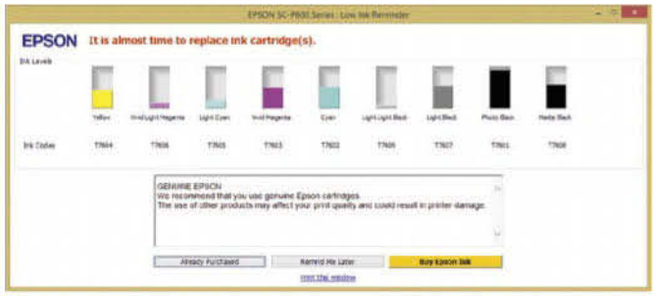


Manual adjustments can be made in the 'Colour Controls' panel.

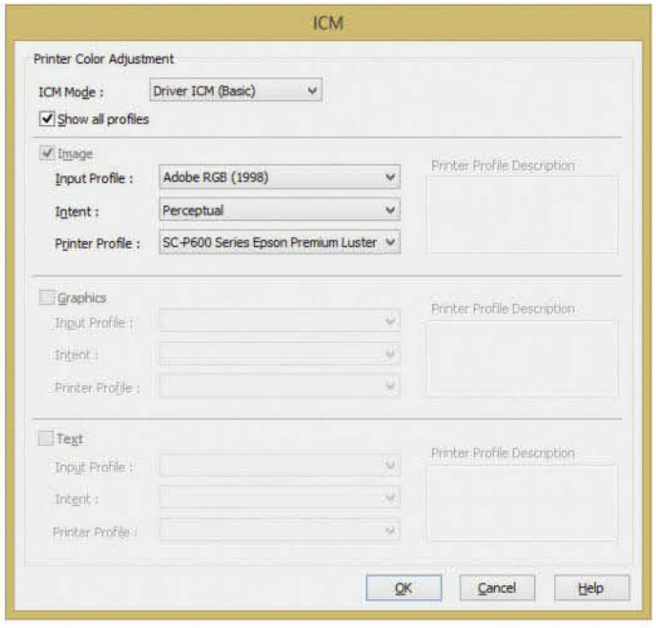


All ink levels can be monitored, along with print progress and the print queue.





The first warning for low ink provides ample scope for several more prints and time to organise replacement cartridges.



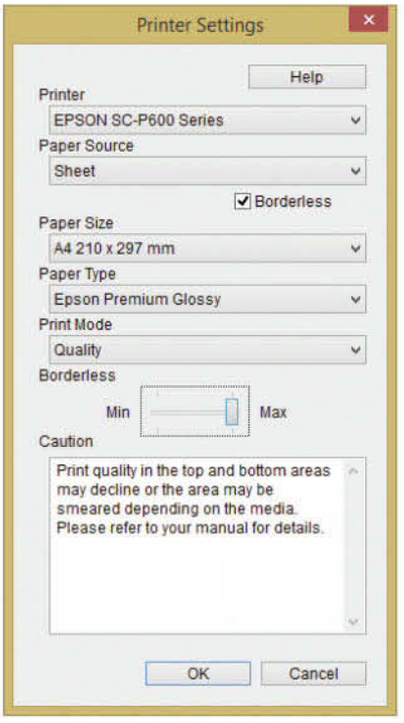
In the 'ICM' panel data for 'Input Profile', 'Intent' and 'Printer Profile' are selected.

The 'Print Preview' is an invaluable feature that should be used all the time.

out the rear paper support only one extension for a wider support). A 1000x30 millimetres image made on a 1200x329 millimetres custom paper size didn't present any difficulties.

The paper was cut from a 610 millimetres wide roll of Schroeller 230 gsm matte and the Epson Archival Matte profile adopted. Maximum resolution and 'High Speed' switched off (no comprises for a big print) may have led to a whopping 36 minutes of printing time, but the result was well worth the wait. Watching the print slowly emerge brought back memories of black and white prints appearing in a darkroom developer tray.

The remainder cut-off piece from the roll – which measured 281x1200 millimetres – was printed by the front feed. This is the better option in ensuring



The 'Printer Settings' panel for printing via Epson Easy Photo Print.

accurate loading on those panoramic prints when paper from the roll holder is not available.

Borderless printing is only available at set sizes of A4, A3, A3+, 100x148 millimetres, 9x13 centimetres, 10x15 centimetres, 13x18 centimetres and 20x25 centimetres. The front feed does not support borderless printing.

While an A3 borderless print at the 'Speed' resolution was produced in just three minutes, it took 16:45 minutes at the 'Maximum Quality' setting (i.e. level 5 and with 'High Speed' off). The difference between these two extremes was not immediately noticeable and requires a magnifier to appreciate the variation. The colour in both prints was identical, but the 'Speed' setting did create some banding in a clear blue sky.

INK USAGE

An accurate assessment of the number of prints per ink set and cost per print would require keeping records of the area of prints created over many ink sets. Our calculations were based on one-and-a-half inksets, weighing full, empty and partially-used cartridges to find the total ink consumed and adding up the total area of printing.

Most printing was carried out at the 'Quality' setting. This resulted in a rough ink cost of about $6.30 for an A3 size print and $3.15 for an A4 print. These are based on a cartridge priced at $47.99 ($1.85/millilitre).

When the first low ink warning occurs there still remains plenty of ink to continue the printing. When the second reminder appears another four or five A4 prints are possible before the "Replace Cartridge" message appears. The cartridge to be replaced is noted on the printer's screen and the computer monitor. Considering the high cost of ink, there is no point in changing ink until the final drop has been consumed.

PROJECT

Apart from producing a number of prints on a variety of papers, one of the best ways to appraise any printer is to see how it handles a typical project. When it comes to D-I-Y book making, dyes have tended to be a better option than pigments because of finer dot structure (for text), deep blacks, strong colours and no problems printing on any paper. The two picolitre ink droplets and the rich blacks of the Epson SC-P600 could well see a change in thinking, especially when the longer life of pigments is taken into account.

THE NEW ULTRACHROME HD INKSET DELIVERED EXCELLENT COLOUR AND THE TEXT WAS CRISP AND SHARP ON A NON-TEXTURED SURFACE. AS A BOOK MAKER ON MATTE PAPER THE SC-P600 IS A DREAM.

The project involved making a book on Schroeller 170 gsm two-sided matte paper using A3+ sheets cut in half to give a size of 329x240 millimetres. Achieving accurate image colour is just one aspect while the sharpness and clarity of text, captions and page numbers is equally important. Twenty sheets at a time were placed in the paper stacker and Indesign commanded to run the pages.

There was no need to prepare a custom ICC profile as Epson's Archival Matte 'canned' profile proved to be an ideal match for the Schroeller paper. The 'Quality' resolution of 1440x1440 pixels was adopted (the 'Speed' setting cannot be used with some papers).

The new UltraChrome HD inkset delivered excellent colour and the text was crisp and sharp on a non-textured surface. As a book maker on matte paper the SC-P600 is a dream.

TEMPTATIONS

Comparison with Canon printers (the PIXMA Pro-1, in particular) on the basis of initial outlay, running costs, intended usage and features are inevitable and then there are other considerations within the Epson range too.

Each model – in this case the SC-P600 replacing the R3000 – sees the price of the previous model fall. This can be enticing especially if the new features of the P600 are not deemed critical.

Stepping up a notch to the R3880 (or the SureColor SC-P800 model to be released soon) means more outlay dollars for bigger prints, bigger cartridges and significantly reduced running costs. Decisions, decisions, decisions. And now here is the SC-P600 as a top performer with the latest in technology. How wonderful to have such options with such great printers.

THE VERDICT

Despite a moderate outlay for the printer, relatively expensive inks and a black ink changeover system that still needs attention, the SureColor SC-P600 certainly knows how to turn out a top quality print. The 25.9 millilitres ink cartridges do mean longer usage before changeover, but this still doesn't negate the relatively high cost of the ink.

The SC-P600 is at its very best on matte or fine-art papers. No surface problems, rich blacks to create a foundation for excellent colour, shadow details retained and very simple approaches to matching up everything to images on screen. Longer printing times are not an inconvenience when quality is actually the principal objective.

This printer should not be regarded as a general purpose 'odd job' model, but a 'state-of-the-art' machine for the very best work at moderate volumes. The CD/DVD label printing capacity, roll paper holder and remote printing capacity are nice features, but not likely to weigh heavily against the prime purpose of sheer quality printing.

The SC-P600 is the first of the "SureColor" branded printers from Epson and it's a great start… plus a good cause to be looking forward to the other models coming in the series.

VITAL STATISTICS

EPSON SURECOLOR SC-P600 $1499

Printer Type: A3+ format (13 inches wide) for photo-quality prints via a nine-colour pigmented inkset (but eight cartridges in use at any one time with auto switching between matte black and photo black).
Maximum Resolution: 5760x1440 dpi.
Ink Cartridges: Individual per colour, 25.9 millilitre capacity. Epson UltraChrome HD pigments. Colours are photo black, matte black, cyan, light cyan, vivid magenta, vivid light magenta, yellow, light black and light light black. Smallest droplet size is 2.0 picolitres via 'Variable Droplet Technology'.
Paper Sizes: Borderless printing on cut sheets from 149x100 mm up to A3+. Paper rolls up to 329 mm in width can be fitted. Customisable print sizes.
Interfaces: Hi-Speed USB 2.0, 100 Base-T Ethernet, WiFi. Epson iPrint Mobile App., Apple Airprint and Google Cloud Print.
Acoustic Noise: 48.2 dB (A).
Main Features: 6.85 cm LCD display panel with touch controls, Micro Piezo on-demand print head with 180 nozzles per colour, variable droplet sizing, five print quality/speed settings, Advanced B&W mode, auto matte/photo black ink switching (according to media type), head alignment and maintenance sensors.
Dimensions (WxHxD): 616x369x228 mm (closed).
Weight: 15.0 kilograms (without ink cartridges or media).
Price: $1499 (inc. GST). Ink cartridges are $47.99 each.
Distributor: Epson Australia, telephone 1300 131 928 or visit www.epson.com.au

PROUDLY SUPPORTED BY Canon

AUSTRALIAN TEENAGE PHOTOGRAPHER OF THE YEAR

ROUND 2 WINNER

Sergio Mendoza

BRISBANE

THE WINNER OF the second round of the Australian Teenage Photographer Of The Year competition is 16-year-old Sergio Mendoza who lives in Brisbane. His portfolio of images – all taken in low light situations – was a stand-out, exhibiting both creative flair and technical skill. Sergio says he likes taking photographs of the urban landscapes that surround him and, in fact, all these images were taken within a ten-kilometre radius of his home.

"These are the things everyone sees in their everyday lives," he comments, "and, as a photographer, I try to showcase these places in a different perspective."

Sergio's ambition is to turn his passion into a profession and… "I want to spend the rest of my life honing my craft". He currently uses a Canon EOS 600D D-SLR.

You can see more of Sergio's photography on Instagram at @smend11 and Tumblr at smend11.tumblr.com

EQUIPMENT

Canon EOS 600D

CALLING ALL YOUNG PHOTOGRAPHERS...

We're looking for the most talented teenage photographer in Australia so, if you're aged between 13 and 19, and think you've got what it takes to be published on these pages, then start putting your portfolio together.

In the last issue of Camera we kicked off the search for the Australian Teenage Photographer Of The Year. There are six chances to impress us with a great portfolio of pictures – and two of these are already gone – so don't miss this great opportunity to get into print (and on our Website) and possibly kick off a career in photography.

At the end the competition, we'll judge all six portfolios and crown somebody the **Australian Teenage Photographer Of The Year**. Our good friends at Canon Australia have given us an EOS 750D D-SLR with an EF-S 18-135mm f3.5-5.6 IS STM zoom lens – currently valued at $1449 – to present as the grand prize. Furthermore, the overall winner will be presented with the inaugural Australian Teenage Photographer Of The Year trophy.

For how to enter, plus full terms and conditions, go to **www.avhub.com.au/teenphotographer**

WIN!

A Canon EOS 750D Super Kit with EF-S 18-135mm f/3.5-5.6 IS STM Lens **valued at $1449**

REPORT BY PAUL BURROWS

NIKON D5500

STAYING IN TOUCH

Nikon's D-SLR renewal program shows no signs of losing steam and its latest mid-range 'APS-C' model packs a lot into a very compact body so it can compete with the growing hordes of rival mirrorless camera.

If the D-SLR – especially at the lower end of the market – is really finding it hard to compete with the increasing number of competitive mirrorless designs, somebody has forgotten to notify Nikon. The company is more active in D-SLRs than ever before and the last two years has seen a steady stream of new models with both 'APS-C' and full-35mm size sensors. Of course, Nikon has a mirrorless camera program too, but so far it's been very careful to keep it from having any impact on its D-SLR business… so, if you're a photography enthusiast, the most attractive Nikons are still definitely reflexes.

In fact, the new D5500 is undoubtedly designed to compete with the CSCs now crowding into its price category, primarily by being more comparable in size, but also by offering many of the features now considered

standard fare in the mirrorless world such as a tilt-adjustable monitor screen with touch control, and WiFi connectivity. Nikon's D-SLR line-up is now so extensive, it's hard to precisely classify the D5500, but at a rough stab, it's essentially at the top end of the entry-level models. That said, it probably has enough goodies to be considered at the bottom end of the enthusiast-level models… with its small size being one reason you might choose it over, say, the also-recent D7200.

In fact, the D5500 is the smallest Nikon D-SLR currently available, the size reduction made possible by adopting a monocoque design which combines elements of the bodyshell and the chassis in one component. Additionally, a new composite material is being used which saves weight without compromising strength, but the body isn't weather sealed. The most noticeable difference compared to the previous model is just how thin the main body is. Leaving aside the handgrip and monitor screen, the narrowest point is just 22 millimetres compared to 50 millimetres for the D5300. As a consequence, the D5500 has a deeper – and more comfortable to hold – handgrip – without adding any extra bulk to the overall package.

Designed to complement the smaller body is the new version of the AF-S DX Nikkor 18-55mm f3.5-5.6 'kit' zoom with a collapsible design which makes it much more compact when it's not being used. True, this adds an extra action to execute after the camera is switched on – the warning "Before taking photos, rotate the zoom ring to extend the lens" appears in the monitor screen – but the size reduction means you can pack everything into a smaller bag and, more importantly, you don't have to sacrifice optical image stabilisation, the conveniences of internal focusing or useful close-up focusing capabilities. Many compact kit zooms are pretty ordinary, but the mark II 18-55mm is a surprisingly good performer… and it weighs just 195 grams so the total 'to go' package is only 665 grams.

NICE TOUCH

Along with the all-new unified body design come revisions to the control layout; the rear input wheel now becomes a full dial while, alongside, the main mode dial is reduced in size because all the subject modes are now accessed from the 'Scene' position. There is, however, only the one input wheel so, for example, when it comes to manual exposure control, you have to use the exposure compensation button to switch it between setting shutter speeds and apertures. Not very D-SLR-like, but pretty common on CSCs.

Despite the size reduction, the D5500 has been able to retain the larger 8.1 cm monitor screen with full tilt and swing adjustments (so it can be folded away with the faceplate facing inward) and a high resolution of 1.037 million dots. As noted earlier, it also has touch controls which is a first on a Nikon D-SLR and provides an alternative operational method for the 'smartphone generation'. Importantly, though, you can still fly the D5500 entirely via the 'traditional' menus and external controls if so desired.

Mind you, the touch screen's implementation is excellent and supports tap, flick, slide and pinch/stretch actions with controllability

UNDOUBTEDLY DESIGNED TO COMPETE WITH THE CSCS NOW CROWDING INTO ITS PRICE CATEGORY, PRIMARILY BY BEING MORE COMPARABLE IN SIZE, BUT ALSO BY OFFERING MANY OF THE FEATURES NOW CONSIDERED STANDARD FARE IN THE MIRRORLESS WORLD."

extending right down to changing apertures and shutter speeds. The efficiencies are undeniable and it really doesn't take long to become completely comfortable with doing things this way. Interestingly, Nikon has provided a proximity sensor on the D5500's viewfinder so the monitor screen automatically switches off when the camera is held up to the eye – a pretty standard feature on mirrorless cameras with their EVFs – not only saving battery power, but obviously a great convenience if you're using the monitor as a control panel. And let's not forget the optical viewfinder – the D-SLR's main claim to fame these days – which provides 95 percent scene coverage and a magnification of 0.82x. Inevitably, it's a pentamirror design (rather than a full prism), but obviously still surpasses any EVF for brightness, dynamic range, colour, resolution and, of course, the complete absence of lag. There's the option of displaying a guide grid.

GET THE PICTURE

On the inside, the D5500 is built around a 24.78 megapixels CMOS sensor with an imaging area of 23.5x15.6 mm. It's a different device to the one used in the D5300 although the effective pixel count is still 24.2 MP, giving the same maximum image size of 6000x4000 pixels. As is now common with many Nikon D-SLRs, there isn't an optical low-pass filter so resolution is optimised at the expense of moiré patterns occasionally being an issue.

The sensitivity range is equivalent to ISO 100 to 25,600 which is now fully covered without needing to switch to extended settings beyond ISO 12,800. The sensor is matched with an 'Expeed 4' processor which, among other things, enables continuous shooting at 5.0 fps and Full HD 1080/50p video recording (see the Making Movies panel).

The D5500 captures JPEGs at one of three sizes and three compression levels (Fine, Normal

Without any dedicated movie cameras to worry about, Nikon is equipping its D-SLRs with comparatively advanced levels of video capabilities. Nikon continues to use the MPEG4 AVC format with the H.264 codec, offering the choice of 50, 25 or 24 fps recording with progressive scan. You can switch between the PAL and NTSC TV standards, the latter's speeds being 60 or 30 fps. There are also 'High' and 'Normal' quality settings for each movie mode, giving bit rates of 42 and 24 Mbps respectively, but using the former reduces the maximum clip length to ten minutes when shooting at 1080/50p.

The built-in microphones are stereo with the choice of auto or manual levels control and a wind-cut filter. The manual adjustment range is over a useful 20 steps. A 3.5 mm stereo audio input is provided for connecting an external microphone.

A 'Manual Movie Settings' control enables the manual adjustment of shutter speeds and sensitivity. Continuous autofocusing is available using contrast-detection measurements, but consequently speed issues (as well as noise) mean that manual control is mostly the better option. That said, the touch AF control can be quite useful for 'pull' focusing which is performed quite smoothly.

The special effects, the 'Picture Control' presets (with any fine-tuning adjustments), the white balance settings and the 'Active D-lighting' processing can all be preselected. As noted in the main text, the newish Flat 'Picture Control' is primarily designed for shooting video. The image stabiliser in a VR-equipped lens is automatically activated during movie recording.

Following both the D5200 and D5300, the D5500 can deliver an uncompressed video output (YCbCr 4:2:2, 8-bit) to its HDMI connection and on to an external recorder. This is obviously something the more serious videographer might make use of, but then the camera lacks many of the features expected at this level such as a focus-peaking display, zebra patterns and headphone output.

The bottom line here, then, is that while the D5500 is quite competent in the video department – and the image quality is very good here – you're still unlikely to buy it solely for this application.

or Basic), while RAW files are recorded with either 12-bit or 14-bit RGB colour and lossless compression. There's a single memory card slot for SD format types with support for the HC and XC types and UHS-I speed transfer (but nothing more exotic).

The JPEG processing options begin with Nikon's 'Picture Control' presets and like all the recent new D-SLR arrivals, the D5500 has an additional one called Flat which is primarily designed for recording video as it maximises the dynamic range, leaving colour and contrast to be more easily adjusted via grading in postprocessing. The remaining six 'Picture Controls' are as before – Standard, Neutral, Vivid, Monochrome, Portrait and Landscape – but also have an additional adjustment parameter called Clarity for adjusting mid-tone contrast. Additionally, the range of adjustment for Brightness is extended to +/-1.5 stops.

The colour presets also have adjustments for sharpening, contrast, saturation and hue, while the Monochrome preset replaces the latter two with contrast filters (yellow, orange, red and green) and toning effects (nine colours each with seven levels of density). The 'Quick Adjust' option remains for changing a number of the parameters simultaneously, but this model doesn't have the Auto adjustment found further up the D-SLR range. Up to nine modified 'Picture Control' presets can be stored and, if desired, renamed.

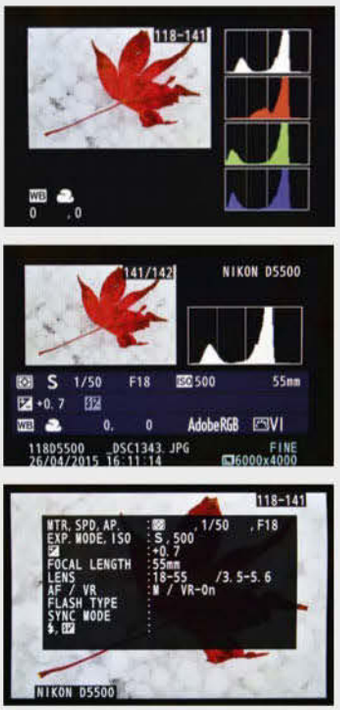
LET'S NOT FORGET THE OPTICAL VIEWFINDER – THE D-SLR'S MAIN CLAIM TO FAME THESE DAYS – IT SURPASSES ANY EVF FOR BRIGHTNESS, DYNAMIC RANGE, COLOUR, RESOLUTION AND, OF COURSE, THE COMPLETE ABSENCE OF LAG."

TAKING EFFECT

Also following current trends in Nikon D-SLRs, the D5500 has a set of 'Special Effects', now expanded to ten and comprising Night Vision, Super Vivid, Pop, Photo Illustration, Toy Camera, Miniature Effect, Selective Colour, Silhouette, High Key and Low Key. These are applied at capture and are all 'standalone' modes… in other words, everything else is controlled automatically and the only manual override available is exposure compensation.

As before though, a selection of special effects are also available for application post-capture via the Retouch Menu, and these create a new, edited file. The choice here include Fisheye, Filters (skylight, warm, cross screen and soft), Colour Outline, Photo Illustration, Colour Sketch, Miniature, Selective Colour and Painting. There's also a 'Quick Retouch' option which progressively tweaks the saturation and contrast after being set to 'Low', 'Normal' or 'High'.

The D5500 has all the in-camera compensation functions now common across Nikon's current D-SLRs – 'Active D-Lighting' processing and multi-shot HDR for dynamic range expansion, noise reduction for both long exposures and high ISOs, and lens corrections for vignetting and distortion. ADL bracketing is available over a sequence of two frames. There's also an intervalometer for time-lapse sequences of up to 9999 frames, but no multiple exposure facility. A single 'Fn' button can be assigned to a frequently-used function such as the ISO or white balance settings, but in practice it's very much easier to use the information display screen (more about this shortly) with touch control. Built-in WiFi allows for wireless image sharing and remote camera control – albeit painfully limited – via a smartphone or tablet running Nikon's 'Wireless Mobile Utility' app. There are no conveniences such as NFC connection.



Replay screen options include a full set of histograms, basic capture data with a brightness histogram or full pages of detailed capture settings.

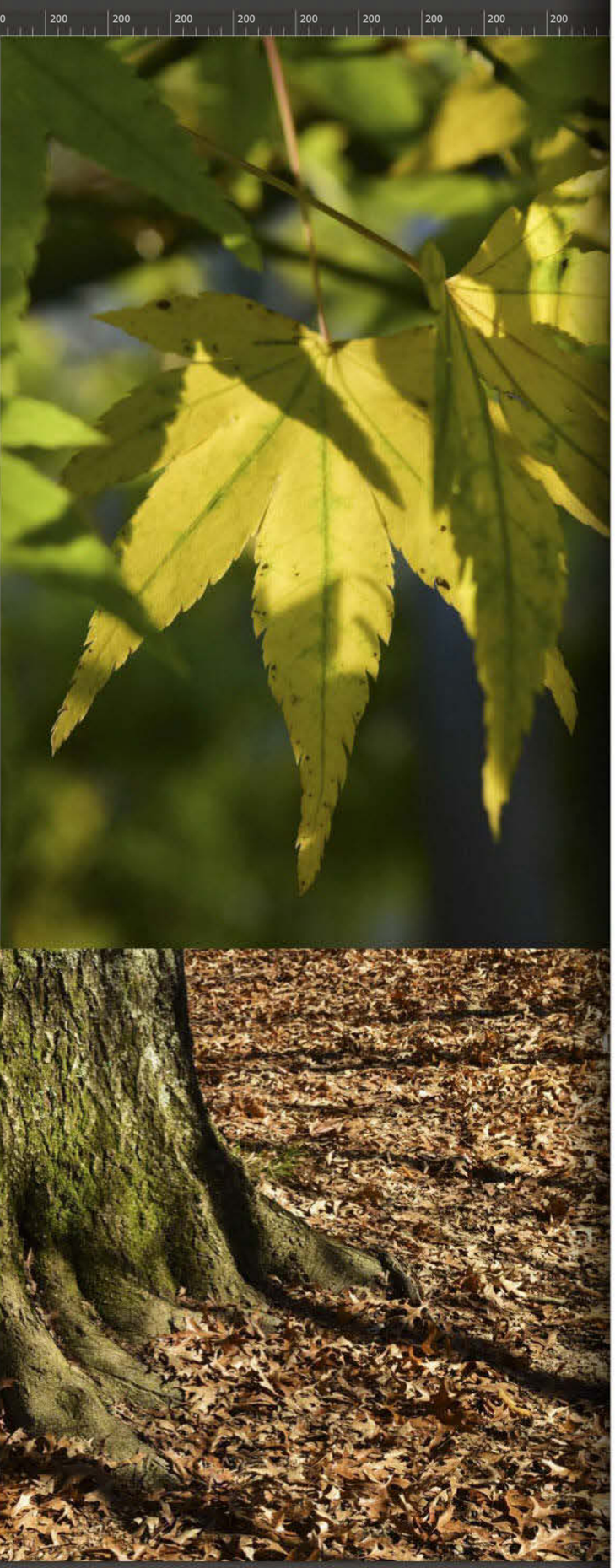
There's a choice of ten 'Special Effects' which are applied at the point of capture. The dedicated menu shows sample effects.

LCD monitor screen is fully adjustable for tilt and swing so it can be folded away with the faceplate facing inward.

WORKING THE SYSTEMS

The main camera control systems are unchanged from the D5300, starting with 'Multi-CAM 4800DX' autofocusing module which employs 39 focusing points, nine of them cross-type arrays. Switching between the single-shot and


img_2445.jpg@100%(RBG/8#)
Info
Test JPEG/large/fine images taken with the 18-55mm f3.5-5.6 VR II zoom lens. Definition, dynamic range and colour fidelity are all excellent. The dynamic range is especially good straight out of the camera. Fine details are well resolved and the tonal gradations are nicely smooth. Noise levels are low up to ISO 3200. The 'Picture Control' presets allow for the fine-tuning of sharpness, clarity, contrast, brightness, saturation and hue.
100%
Doc: 2.8mb



continuous operations can be done manually or automatically whenever the camera detects subject movement. Manual switching is made more convenient via the touchscreen controls. There's the choice of manual or auto AF point selection, and points can also be selected in groups of nine or 21 as well as the full 39. '3D Tracking' operates in the continuous AF mode, switching the points as the subject travels across the frame. Face recognition AF is available in live view when the D5500 switches to contrast-detection measurements using the imaging sensor. Like all Nikon's entry-level D-SLRs, the D5500 doesn't have a body-based focusing motor so AF is only available when using AF-S Nikkor lenses or non-Nikon lenses with built-in focusing drives.

Exposure control is via Nikon's '3D Colour Matrix Metering II' system which is based on a 2016-pixels RGB sensor to give multi-zone measurements. Alternatively, centre-weighted average and spot measurements are available.

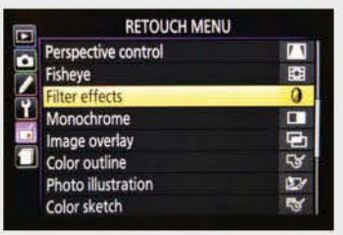
The standard 'PASM' exposure control modes are supported by program shift, an AE lock, compensation of up to +/5.0 EV, and auto bracketing which operates over three frames with correction of up to +/-2.0 EV per frame. All the exposure-related settings can be made in either one-third or half stop increments, preselected in the camera's extensive Custom Menu. There are a total of 16 subject/scene modes with automatic selection operating when the camera is in the fully auto point-and-shoot mode. The shutter has a speed range of 30-1/4000 second with flash sync up to 1/200 second.

Nikon's 'Scene Recognition System' runs behind the scenes – based on an extensive built-in database of subject scenarios – to optimise the exposure, focusing, white balance and flash control. The D5500's built-in flash has a metric guide number of 12 (at ISO 100) and provides the option of i-TTL auto control – using low-powered preflashing to determine exposures – or manual control which enables the power output to be wound down to 1/32. Flash compensation is available over a range of -3.0 to +1.0 EV, and the sync modes include slow-speed and second-curtain. However, as before at this model level, the built-in flash can't operate as the commander for a wireless TTL flash set-up.

The RGB-sensitive metering sensor is also used to measure colour balance and the auto correction mode is supplemented by a total of 12 presets which includes seven which

"... THE TOUCH SCREEN'S IMPLEMENTATION IS EXCELLENT AND SUPPORTS TAP, FLICK, SLIDE AND PINCH/ STRETCH ACTIONS EXTENDING RIGHT DOWN TO CHANGING APERTURES AND SHUTTER SPEEDS."

Menu design is Nikon's standard arrangement and remains one of the most logical on either a D-SLR or CSC.



The Retouch Menu provides a further selection of special effects which can be applied post-capture, creating a new file.

Info screen serves as a control panel with touchpad tiles for accessing key capture-related functions.

are for the different types of gas-ignition lighting (with their own separate sub-menu). One custom measurement can be made and stored, and all the presets can be fine-tuned in both the blue-to-amber and green-to-magenta colour ranges. There's also a white balance bracketing function, but – and another reminder of the D5500's consumer-level roots – there's no provision for manually setting a colour temperature nor a keep-warm-tones auto mode.

ON SCREEN AND IN CONTROL

As per its predecessors, the D5500 has the choice of 'Classic' or 'Graphic' style main information displays, the latter showing the shutter speeds and ISO settings as 'virtual' dials and the apertures via a virtual diaphragm (which closes down as the smaller settings are selected). However, there's now a touch control option which brings up left/right arrows for making these adjustments via tapping the screen. Additionally, these displays can be separately configured for when the camera is in the 'PASM' modes or in the Auto/Scene/Effects modes, and there's option of white-on-black or black-on-white.

Similarly to the most recent Nikon D-SLRs, the D5500 also has a separate interactive control screen which provides direct access to a wide range of capture-related functions and, of course, also allows for operation via touch. In live view, these function tiles are superimposed over the image and the exposure settings are also adjustable by touch and there are touch screen focusing and shutter release functions. The live view display can be configured with a guide grid or switched to the video aspect ratio (complete with audio level meters), but there's no real-time histogram, no electronic level display and no focus peaking display… again reminders that, in the end, this is still less of an enthusiast-level camera than the D7200. Focus assist in live view is via a magnified image.

The image review screens can, as usual on a Nikon D-SLR, be expanded to cycle through a variety of displays, including a thumbnail with a full set of brightness and RGB histograms, and various pages of image capture data which increases if copyright details are included and/or the optional GPS receiver is fitted. The highlight warning can be cycled through the RGB channels separately. The playback options include 4/12/80 thumbnail displays, a calendar thumbnail page, zooming up to 38x and a simple slide show with variable image display times.

We've already touched on some of the image editing options available, but these also include distortion correction, perspective control, monochrome conversion and RAW-to-JPEG processing.

SPEED AND PERFORMANCE

With our Lexar Professional 600x 64 GB SDXC UHS-I reference memory card loaded, the D5500 captured 21 JPEG/large/fine frames in 4.252 seconds, representing a shooting speed of 4.93 fps which is obviously pretty close to the quoted 5.0 fps. The average file size was 12.6 MB.

With pretty much all the D5500's image-making weaponry already proven elsewhere – although the sensor is different – there aren't many surprises as far as its performance is concerned. The 39-point phase-detection AF is both fast and very reliable (including when tracking), but the contrast-detection operation isn't really up to what's now being offered by the best CSC's such as Panasonic and Fujifilm or the various hybrid systems. The 2016-pixel '3D Colour Matrix II' metering is also reliable, even in challenging situations with an extreme brightness range.

The best-quality JPEGs exhibit plenty of well-defined detailing with accurate colour renditions across the spectrum and very smooth tonal gradations. Of course, the 'Picture Control' presets provide plenty of

WITH PRETTY MUCH ALL THE D5500'S IMAGE-MAKING WEAPONRY ALREADY PROVEN ELSEWHERE – ALTHOUGH THE SENSOR IS DIFFERENT – THERE AREN'T MANY SURPRISES AS FAR AS ITS PERFORMANCE IS CONCERNED."

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A new monocoque design integrates the chassis and main body panels into one component, enabling a noticeable reduction in size.

THE SIZE, WEIGHT AND OPERATIONAL CONVENIENCES – NOT TO MENTION THE BENEFITS OF AN OPTICAL VIEWFINDER – KEEP IT FIRMLY IN THE RACE AGAINST COMPARABLY-PRICED CSCS WITH AN 'APS-C' SIZE SENSOR..."

scope for tweaking images if more colour saturation, hue, sharpness and contrast are desired.

The dynamic range is extremely good straight out of the camera and without any expansion processing, but as we've noted before, ADL does make a small, but noticeable difference to the highlights.

Noise levels aren't an issue up to ISO 3200 and still ensure acceptable looking images at ISO 6400. The colour saturation remains pretty good at both ISO 12,800 and 25,600, but there's a noticeable loss of definition and some blotchiness evident in areas of continuous tone. Nevertheless, this is where the D5500 improves upon its predecessors thanks partially to ongoing developments in sensor design and to the continual refinement of the noise reduction processing algorithms.

THE VERDICT

The D5500 is a bit of a mixed bag, probably because Nikon is trying to maintain separation from the D7200, but the end result is that in some areas it's been more than generous and in others quite miserly. There's lots to like, including the small size – achieved without unduly compromising the ergonomics – the undoubted benefits of the touch control capabilities, and the excellent image quality, especially at the higher ISO settings. But enthusiast-level shooters may be frustrated by the absence of features that are considered important by many such as manual colour temperature setting, AF micro-adjust, wireless TTL flash control, very little scope for customisation and a dual-axis level display.

On balance though, the plusses – because they're mostly all the really serious stuff – outweight the minuses, and the more you use the D5500, the more you're going to like it. It has plenty of attractions as a second body for Nikon 'DX' users, much more so than a 1 Nikon camera used with the F-mount converter, but will still function very competently as your 'frontline' camera. The size, weight and operational conveniences – not to mention the benefits of an optical viewfinder – keep it firmly in the race against comparably-priced CSCs with an 'APS-C' size sensor, as does the wide choice of lenses from both Nikon and the 'independents'. Yes, the core ingredients are much the same as those of the D5300, but Nikon has added some extra spices and seasoning to come up with a much tastier dish.

VITAL STATISTICS

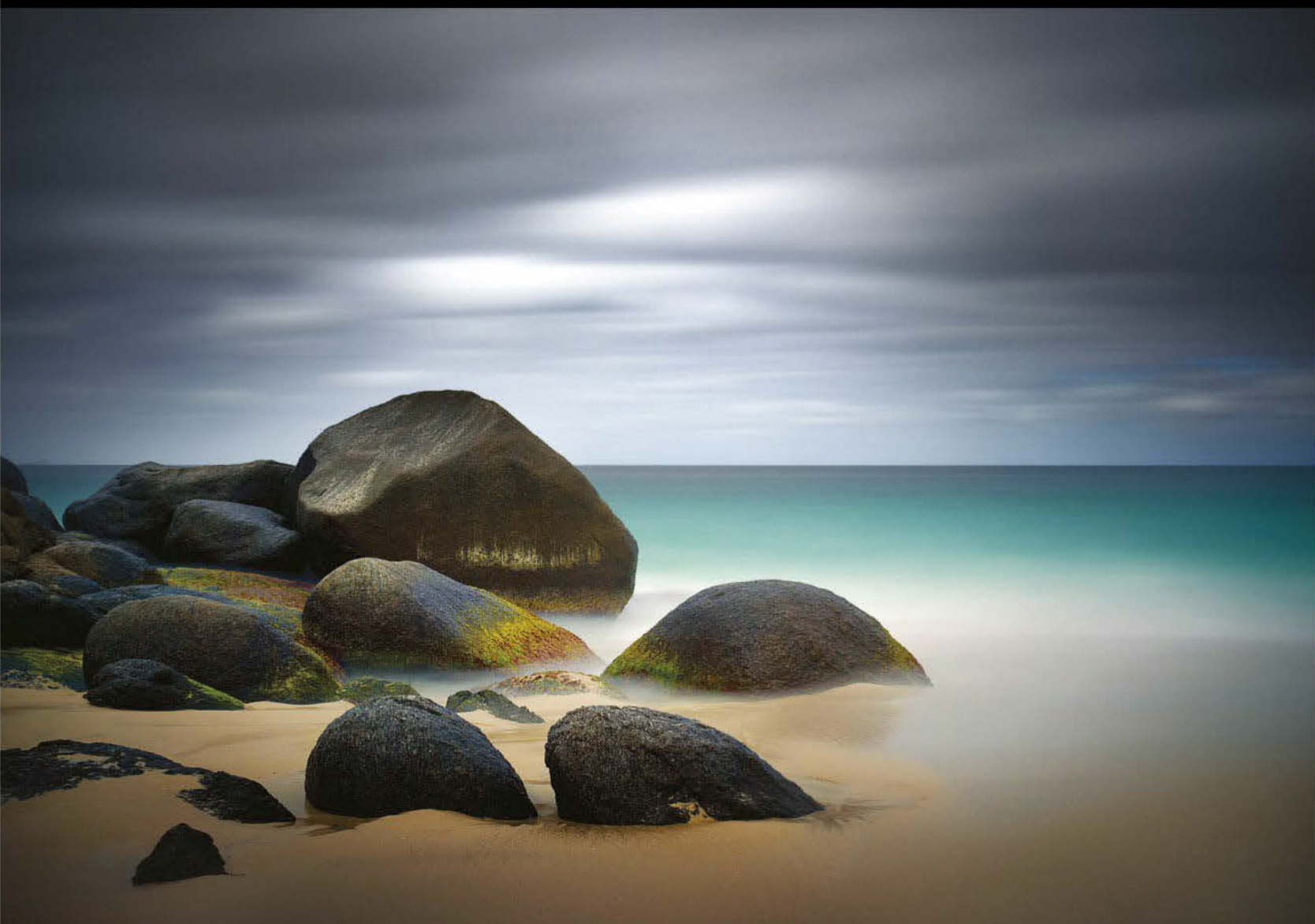
NIKON D5500 $1049*

* with Nikkor AF-S 18-55mm VR II zoom lens. Estimated average street price.

Type: Fully automatic digital SLR with Nikon F bayonet lens mount (AF-S and AF-I lenses fully supported, all others with manual focusing only).
Focusing: Automatic 39-point wide-area system using phase-detection type CCD sen sor arrays (nine cross-type arrays). Focus points may be selected manually or automatically and either as single points or in groups (9/21/39). Auto or manual switching between one-shot and continuous AF modes, the latter with a predictive function. Face priority and auto tracking. Sensitivity range is EV -1 - 19 (ISO 100). AF assist provided by built-in illuminator.
Metering: 2016-point '3D Colour Matrix II', centre-weighted average, spot (3.5mm/2.5%) and i-TTL flash. Metering range is EV 0 to 20 (ISO 100/f1.4). Spot metering range is EV 2 to 20.
Exposure Modes: Continuously-variable program with shift, shutter-priority auto, aperture-priority auto, metered manual, i-TTL auto flash and TTL flash. Plus 16 subject/scene modes.
Shutter: Electronic, vertical travel, metal blades, 30-1/4000 second plus B. Flash sync to 1/200 second. Exposure compensation up to +/-5.0 EV in 1/3 or ½ increments.
Viewfinder: Coverage = 95% vertical/horizontal. Magnification = 0.82x (50mm lens at infinity). LCD display and LED focus point indicators. Fixed focusing screen. Eyepiece strength adjustment built-in.
Flash: Built-in pop-up unit with GN 12 power (ISO 100). Auto, fill-in, red-eye reduction, front/rear sync and slow speed sync modes. External flash units connect via hotshoe. Flash compensation range of -3.0 to +1.0 EV in 1/3 or ½ stop increments. Manual control down to 1/32 of full power.
Additional Features: Carbonfibre monocoque construction, AE lock, auto exposure bracketing (over three frames), multi-mode self-timer (2 to 20 second delays, one to nine exposures), intervalometer, wireless remote triggering, wired remote triggering, quiet shutter release, audible signals, auto power-off, 21 custom settings. Nikon's VR-equipped lenses have built-in optical image stabilisation.

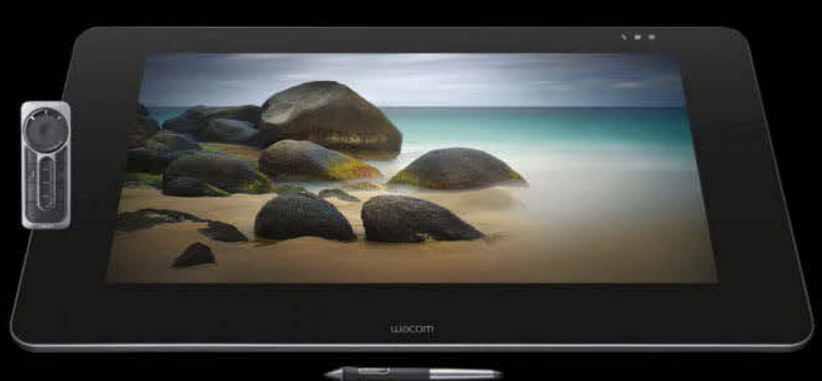
DIGITAL SECTION

Sensor: 24.78 million (total) pixels CMOS with 23.5x15.6 mm imaging area and 3:2 aspect ratio. Sensitivity equivalent to ISO 100-25,600.
Focal Length Magnification: 1.5x.
Formats/Resolution: Three JPEG compression settings (1:4, 1:8 and 1:16), 12-bit or 14-bit RAW output (lossless compression) plus RAW+JPEG capture. Three resolution settings; 6000x4000, 4496x3000 and 2992x2000 pixels. 36-bit RGB colour for JPEGs, 36-bit or 42-bit RGB colour for RAW files.
Video Recording: Full HD = 1920x1080 pixels at 50, 25 or 24 fps (PAL, progressive) and 16:9 aspect ratio. HD = 1280x720 pixels at 50 fps (PAL, progressive) and 16:9 aspect ratio. MOV format with MPEG 4 AVC/H .264 compression. Stereo sound recording with auto/manual adjustable levels. Stereo microphone input provided. Clip duration limited to 20 minutes at normal quality (1080/50p, 24 Mbps), up to 10 minutes at high quality (1080/50p, 42 Mbps). File size limit is 4.0 GB.
Recording Media: SD/SDHC/SDXC memory cards with UHS-I speed support.
Burst Rate: Up to 100 frames at 5.0 fps in JPEG/large/fine mode, up to 14 frames in RAW mode (12-bit, lossless compressed). Low speed continuous shooting mode operates at 3.0 fps.
White Balance: TTL measurements using the 2016-pixels RGB metering sensor. Auto/manual control with 12 presets and one custom setting. White balance fine-tuning available for AWB and all presets. White balance bracketing (over three frames).
Interfaces: USB 2.0, mini HDMI (Type C), NTSC/PAL video output, 3.5mm stereo audio input.
Additional Digital Features: Live view with contrast detection AF, active sensor cleaning, variable-angle 8.1 cm LCD monitor (1.037 megadots) with touch controls, Adobe RGB and sRGB colour spaces, long exposure noise reduction (On, Off), high ISO noise reduction (Off, Low, Normal, High), ten special effects modes (Night Vision, Super Vivid, Pop, Photo Illustration, Toy Camera, Miniature Effect, Selective Colour, Silhouette, High Key and Low Key), seven 'Picture Control' modes (Standard, Neutral, Vivid, Monochrome, Portrait, Landscape and Flat), adjustable picture parameters (sharpness, clarity, contrast, brightness, colour saturation and colour hue, with a 'Quick Adjust' option), nine custom 'Picture Controls', B&W contrast filters and toning effects (nine colours/seven levels), 'Active D-Lighting' processing (Off, Low, Normal, High, Extra High, Auto), ADL bracketing (two frames), multiple exposure HDR capture (Off, Low, Normal, High, Extra High, Auto), lens distortion correction (Off, On), lens vignetting correction (Off, Low, Normal, High), luminance/RGB histogram displays, highlight alert, adjustable image display time, auto image rotation, 'Retouch Menu' for in-camera editing (Trim, Resize, D-Lighting, Quick Retouch, Red-Eye Correction, Straighten, Distortion Control, Perspective Control, Fish-Eye, Filter Effects, Monochrome/Sepia/Cyanotype, Image Overlay, Colour Outline, Photo Illustration, Colour Sketch, Miniature Effect, Selective Colour, Painting, RAW-to-JPEG Processing and Edit Movie), adjustable filter effects (Skylight, Warm, Cross Screen, Soft), 4/12/80 thumbnail displays, thumbnail calendar display, zoom playback (up to 38x), slide show with variable image display time, built-in WiFi with NFC connectivity. May be fitted with optional GP-1 or GP-1A GPS receivers. PictBridge and DPOF support.
Power: One 7.2 volt/1230 mAh rechargeable lithium-ion battery pack (EN-EL14a type).
Dimensions (WxHxD): body only = 124.0x97.0x70.0 mm.
Weight: body only = 420 grams (without battery pack or memory card).
Price: $899 body only. $1049 with AF-S DX Nikkor 18-55mm f3.5-5.6G VR II zoom. Estimated average street prices.
Distributor: Nikon Australia Pty Ltd, telephone 1300 366 499 or visit www.mynikonlife.com.au



Photograph by Peter Eastway, G.M. Photog.

Tools transform. Artistry remains.



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REPORT BY **PAUL BURROWS**

PANASONIC
LUMIX DMC-G7

G FORCE

The next-gen SLR-style Lumix G camera not only offers more features, but is even more competitively priced… and Panasonic continues to blur the lines between shooting stills and video.

If you're already a Micro Four Thirds convert, there's a lot to be excited about at the moment as both Olympus and Panasonic continue to pour plenty of resources into their shared compact system camera platform. If you aren't, then recent arrivals such as the OM-D E-M5 Mark II and, now, Panasonic's Lumix G7 are surely good reasons for taking a closer look at the format.

Ever since the original G1 (launched back in early 2010), Panasonic's SLR-style mirrorless cameras have been solid performers with a key objective being to lure D-SLR users while also mounting a strong case for the smaller MFT sensor size… the key benefit being most evident in the size of the lenses. Of course, there's the GH, GX and GM

lines, but the 'straight' G series has always been the backbone of Panasonic's CSC program and this is even more the case with the G7 which is significant on a number fronts. As ever, it incorporates a range of refinements which stem from Panasonic's – highly commendable, it has to be said – willingness to listen to consumer feedback and implement changes, but also has new features which reflect broader developments in digital camera design. These include stepping up to 4K resolution video shooting and a further development of Panasonic's '4K Photo' capability (more about this shortly).

Particularly interestingly, the G7 has a new body design which has a more retro look, in a similar manner to that adopted by Fujifilm for the X-T10. The styling lines are distinctly sharper than those of the previous models with a lower-profile central housing more reminiscent of the days before 35mm SLRs incorporated a flash here (except the G7 still fits in a pop-up flash). There's a more substantial handgrip – again looking distinctly 'old school' – but more importantly, the control layout has been revised and now offers a proper twin-dial arrangement for inputting settings, with main dials for both the shooting modes and the drive/self-timer modes. The key outcome here is a more D-SLR-like shooting experience using external controls, although the option of driving the G7 via its touchscreen monitor remains for those who like this way of working. The twin dials make a big difference to exposure control and can be switched between manually setting the apertures or speeds in the semi-auto modes – depending on which arrangement feels more comfortable – and the second dial then applies exposure compensation. It's the traditional way of doing things, but still supremely efficient, particularly when you're using fully manual exposure control.

The G7 is marginally bigger than its predecessor, but still compact by D-SLR standards. The main mode dial now has a position for the fully automatic 'Intelligent Auto' (iA) control which previously had a dedicated button, and there's an external selector for the focus modes with, logically, the AF/AE lock button located within.

There's now a total of 11 programmable 'Fn' controls, including six 'on the outside', one of them being a button set within the rear input wheel. The other five are 'virtual' tiles selected via the touchscreen and the G7 has a 7.62 cm monitor screen that's adjustable for both tilt and swing, and has a resolution of 1.04 megadots. This is pretty much the same as before (although it's a brighter display thanks to more powerful backlighting), but the camera's EVF is significantly upgraded to an OLED-type display with a resolution of 2.36 megadots and a magnification of 1.34x (equivalent to 0.67x). Proximity sensors in the eyepiece allow for automatic switching between the EVF and the monitor screen, but either can also be set manually to operate alone.

EIGHT IS ENOUGH...

On the inside, the G7 has a new sensor, the more powerful quad-core 'Venus Engine 9' processor (primarily to handle the demands of 4K video), the 'Depth From De-focus' (DFD) autofocusing control from the flagship GH4, and UHS-II support for the higher speed SDXC memory cards.

The sensor is a 'Live MOS' device (a.k.a. a CMOS) with a total pixel count of 16.84 million, although the effective count remains at 16 MP, giving a maximum image size of 4592x3448 pixels. However, the sensitivity range is improved and now spans ISO 200 to 25,600 with a one-stop 'pull' expansion setting for ISO 100. This is achieved via an enhanced signal-to-noise ratio and new noise reduction processing algorithms.

As is common across the Lumix G range, there's a choice of four aspect ratios, each with three image sizes and either Standard or Fine JPEG compression settings. Thanks to the new processor, the continuous shooting speed increases to 8.0 fps at full resolution and with the AF/AE locked to the first frame, and 6.0 fps with continuous adjustment. However, switch to using the sensor shutter and the top speed increases to 10 fps.

Still on the subject of continuous shooting, there's now a choice of three '4K Photo' modes which are accessed via the drive dial which emphasises their photographic applications. In these modes the G7 is actually shooting 4K video at 30 fps (albeit with some image processing variations to suit still capture), but Panasonic is leveraging the fact that a 4K frame is 8.3 megapixels in size and so has sufficient image quality for a range of uses. The three modes are called '4K Pre-Burst', '4K Burst' and '4K Burst Start/Stop'. In the Pre-Burst mode, a sequence of 60

"THE LUMIX G7 HAS A NEW BODY DESIGN WHICH HAS A MORE RETRO LOOK, IN A SIMILAR MANNER TO THAT ADOPTED BY FUJIFILM FOR THE X-T10."

frames is captured in two seconds, but the clever bit is that these are divided into 30 recorded before the shutter is fully released and 30 subsequently. The idea here is that you won't miss the crucial frame in an action sequence because you were a bit slow to react… the camera already has 30 frames in the bag. The Burst mode is more conventional and simply goes on shooting at 30 fps for as long as the shutter button is held down… up to a duration of 29 minutes and 59 seconds.

However, anything longer than a minute or two is going to challenge your shutter finger so Panasonic has thoughtfully provided the Start/Stop option which works a bit like the old 'T' setting for long exposures… one press of the shutter button starts the sequence and a second press stops it. You can run '4K Photo' shooting with any of the 'PASM' exposure control modes and a new touchscreen interface makes it much more straightforward to extract the frames you want. Additionally, the four aspect ratios are available

While not in the same league as its big brother GH4, the G7 nevertheless offers a high level of video functionality, starting with the ability to record at the Ultra HD resolution of 3840x2160 pixels (a.k.a. 4K video) at either 25 fps (the PAL TV standard) or 24 fps. However, unlike the GH4, it doesn't have a 'true' DCI 4K mode.

UHD video is recorded in the MP4 format using MPEG-4/H.264 AVC compression, giving a bit rate of 100 Mbps which equates to exceptional picture quality.

Full HD video can be recorded in either the MP4 or AVCHD formats and at 50, 25 or 24 fps. Interestingly, the G7 is TV region specific so, in our market, it isn't possible to use the NTSC speeds of 60 or 30 fps.

The G7 has built-in stereo microphones which are supplemented by a stereo audio input (using a 3.5 mm minijack connector). Audio levels can be adjusted manually over a useful range of -12 dB to +6dB. There's also a level limiter and a wind noise filter. Video-specific features comprise zebra patterns (a choice of two types) which indicate areas of overexposure without obliterating them like still camera's highlight warning, and two gamma profiles called 'Cinelike D' and 'Cinelike V'. These are 'Photo Style' presets specifically for shooting video, although they have the same adjustable parameters. 'Cinelike D' eschews everything else to give the best possible dynamic range in order to provide more control in post-production (i.e. for processes such as colour grading). 'Cinelike V' tweaks the colour saturation and contrast to give a more 'filmic' look. The standard 'Photo Style' presets are also available for shooting video as well as 17 of the 'Creative Control' special effects.

You can choose to shoot in any of the 'PASM' exposure control modes with continuous autofocusing. Also available are the 'i.Dynamic' and 'i.Resolution' processing functions plus 'Diffraction Compensation'. The HDMI connection can output a 'clean' feed, either 4K or 2K, for recording via an external device.

All this is pretty impressive for a camera with a body-only price of $899 and while, compared to the GH4, this body isn't weather-proofed and only allows for a maximum bit rate of 28 Mbps with 1080/50p FHD recording (compared to 200 Mbps), nevertheless the G7 still has plenty of attraction for the enthusiast-level videographer. And, of course, it's capable of serving as an affordable back-up camera to the GH4.

"WHILE WE'RE CURRENTLY BEING DAZZLED BY ULTRA-HIGH PIXEL COUNTS, IT'S WORTH NOTING THAT 8.3 MP IS QUITE SUFFICIENT INFORMATION FOR A GOOD A4-SIZE PRINT AND OBVIOUSLY MORE THAN ENOUGH FOR ANY DIGITAL DISPLAY APPLICATION."

(maintaining the 8.3 MP image size regardless) and full EXIF data is actually recorded for each frame. While we're currently being dazzled by ultra-high pixel counts of up to 50 MP in still cameras, it's worth noting that 8.3 MP is quite sufficient information for a good A4-size print and obviously more than enough for any digital display application. We live in interesting times.

FOCUS ON FOCUS

The G7's 'DFD' autofocusing is still sensor-based so it's still using contrast detection, but it operates in pretty much the same way as phase-difference detection.

As the title suggests, DFD uses the lens's out-of-focus characteristics – derived from grabbing two frames in quick succession as the lens is focusing – to be used to determine the subject distance and this calculation is then referenced to the contrast-detection AF's measurement.

Subsequently, the lens is then driven pretty well directly – and continuously – to the focusing distance with only minor fine-tuning at the end. This increases both speed and the reliability so it's particularly beneficial to the continuous AF and focus tracking operations, but Panasonic claims a speed of just 0.07 seconds which makes the G7 twice as fast as the G6. Tracking accuracy is further enhanced by the employment of a new algorithm which, in addition to the subject's colour, also recognises its size and motion vector.

Like the GH4, the G7's AF system employs 49 focusing points (arranged in a 7x7 pattern), but it has a new function called 'Starlight AF' which can work on a much smaller point, assisted by low-light sensitivity which extends down to EV -4.0. It also has the 'Custom Multi' mode which allows the number of focusing points and how they're shaped to be freely adjusted to suit the subject. Alternatively, the focusing zone's area can be adjusted to one of eight sizes.

Manual focusing is assisted by a magnified image section (up to 6.0x and which is easily moved around the frame), a simple distance scale and a focus peaking display with a selection of three colours each in two intensity levels.

WORKING THE LIGHT

On the exposure side, the G7 follows the well-trodden route in Lumix G cameras based on a 1728-zone metering system with a choice of centre-weighted average and spot measurements.

In addition to the aforementioned 'PASM' exposure modes, there's a selection of 24 subject/scene modes. In the 'iA' mode, the G7 performs automatic scene mode selection using a number of determining criteria to define a subject… the appropriate icon appears in the top left-hand corner of the EVF/monitor display. A nice touch – literally – is that you can select the appropriate subject mode by touching on an object in the live view image (i.e. a face for the portrait mode).

There's also an 'iA+' mode which provides limited manual adjustments for depth-of-field, brightness and colour balance. The suite of 'iA' controls includes backlight compensation, dynamic range expansion processing, sensitivity adjustment, focus tracking, face detection and recognition, red-eye removal and 'Shading Compensation' which corrects for lens vignetting.

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Info
Test images captured as JPEG/large/fine files using the Lumix G Vario 14-42mm f3.5-5.6 ASPH 'kit' zoom and Voigtländer Nokton 10.5mm f0.95 wide-angle prime. Detailing, colour fidelity and dynamic range are all excellent. Noise levels are non-existent up to ISO 3200 and the G7 actually performs well across its full native sensitivity range. The 'DFD' autofocusing system – shared with the flagship GH4 – is fast and reliable.
100%
Doc: 2.8mb

"THE G7'S MFT SENSOR MAY 'ONLY' BE 16 MP, BUT WHO REALLY CARES WHEN THE CAMERA IS DELIVERING IMAGES THAT ARE PACKED WITH WELL-DEFINED DETAILING, ACCURATE COLOUR RENDITION ACROSS THE SPECTRUM AND A SURPRISINGLY WIDE DYNAMIC RANGE.

Menu system is largely unchanged from the previous model and remains both well designed and logical to navigate.

4K video shooting is available at either 24 or 25 fps in the MP4 format. Bit rate is an impressive 100 Mbps.

As always, 'iA' proves to be exceptionally capable if you need to just point and shoot.

For those who like to be in charge of things, the exposure overrides include +/-5.0 EV of compensation, the AE lock and auto bracketing (also selected via the drive dial). Beyond these, the image processing functions include dynamic range expansion, multi-shot HDR capture, long exposure noise reduction, lens corrections (for both vignetting and diffraction), resolution enhancement and the 'Highlight/Shadow' adjustment control that's shared with the Olympus OM-D cameras. This works like a simplified version of Photoshop's Curves with adjustments applied to a tone curve displayed in the monitor screen. The front control wheel tweaks the highlights while the rear one works on the shadow. Up to three custom settings can be stored plus there are three presets.

The sensor shutter enables a top speed of 1/16,000 second (and also silent shooting) while the conventional focal plane shutter has a speed range of 60-1/4000 second with flash sync up to 1/160 second. The built-in flash is supplemented by a hotshoe. The onboard modes include fill-in, red-eye reduction, slow-speed sync, second curtain sync and up to +/-3.0 EV of compensation.

GET CREATIVE

There's a selection of six 'Photo Style' presets for JPEG capture which have adjustments for contrast, sharpness, colour saturation, hue and noise reduction. The Monochrome preset replaces the colour-related parameters with a toning adjustment (from sepia to cyanotype) and a set of B&W contrast filters (i.e. yellow, orange, red and green). There's provision for storing one customised 'Photo Style'.

A total of 22 'Creative Control' special effects are provided and these can be accessed via the main mode dial as stand-alone control modes or via the main shooting menu for application to the 'PASM' modes. This selection includes all the standard offerings (such as Retro, Toy, Miniature, Star Filter and Soft Focus) plus some 'Panasonic specialities' called Rough Monochrome, Impressive Art and Bleach Bypass.

The white balance control options comprise auto correction supplemented by five presets and four custom measurements (increased from two) plus manual colour temperature setting from 2500 to 10,000 degrees Kelvin.

The G7 also has a multiple exposure facility with auto exposure adjustment and overlay controls, in-camera panorama stitching (for up to 360 degrees) and an intervalometer which can be set to capture time-lapse sequences of up to 9999 frames. WiFi is built-in, but curiously this model loses the NFC connectivity for Android devices so everybody now has to hook-up the same way.

SCREEN TIME

The live view screen can be configured with a variety of displays, including a dual-axis electronic level, an exposure meter (with aperture and shutter speed sliding scales), a real-time histogram, guide grids (selected from a choice of three), zebra patterns (to indicate areas of overexposure) and a centre marker (particularly useful when shooting video). The histogram can be moved around – by simply dragging it – and positioned anywhere in the frame while one of the grid displays allows for the grid lines to be moved around by touch as well.

With everything switched on, there's a fair amount happening, but obviously you can pick and choose which elements you want to include.

Both the monitor and the EVF can also display the 'Quick Menu' control screen which is an alternative to using the standard menus and made even handier by the touch controls available with the former. It's also extensively customisable so you can arrange the Q.Menu to display all your commonly-used capture-related adjustments or functions.

The image review screens a highlight warning, a thumbnail accompanied by a full set of histograms or a thumbnail with a detailed set of capture data.

The playback functions include thumbnail pages of 12 or 30 images, a calendar thumbnail display, zooming up to 16x and a slide show with a choice of transition effects. There's also a 'Clear Retouch' function which is similar to another Photoshop tool, Content Aware Fill, and is used to remove unwanted objects in a captured image, but with, it has to be said, fairly limited success (because it's almost impossible to be precise).

SPEED AND PERFORMANCE

Loaded with our reference 64 GB Lexar Professional SDXC (Speed Class 1) memory card, the G7 fired off a burst of a burst of 61 JPEG/large/fine frames in 7.361 seconds which represents a continuous shooting speed of 8.3 fps, bettering Panasonic's quoted spec for the focal plane shutter and no AF or AE adjustment between frames. Switching to the sensor shutter – which is done in the main shooting menu – a burst of 65 images was completed in 6.672 seconds, giving a shooting speed of 9.7 fps. The test image file size averaged 6.45 MB so, put simply, the G7 is no slouch.

The AF speed is also exceptionally fast and the extended low light sensitivity makes for supremely reliable AF operation in just about any situation. It's backed up by the metering which is already proven in earlier Lumix CSCs and ensures accurate exposures even in the most challenging of contrasty lighting. It's ironic that with a camera that makes it so easy to apply exposure compensation on-the-fly, you actually rarely need to.

'Quick Menu' allows direct access to a wide selection of capture-related settings. It's also displayed in the EVF. White Balance adjustments shown here.

There are three '4K Photo' modes specifically designed for still photography applications, but using frames extracted from 4K video footage.

The main monitor screen can also serve as a comprehensive info display.

With both the GH4 and GX7, in particular, setting the bar high for imaging performance from a Lumix CSC, the G7 doesn't have any trouble keeping up. Again Panasonic (as does Olympus) makes you question the popular perceptions about sensor size and pixel counts. The G7's MFT sensor may 'only' be 16 MP, but who really cares when the camera is delivering images that are packed with well-defined detailing, accurate colour rendition across the spectrum and a surprisingly wide dynamic range without resorting to expansion processing. As with the GH4, detail is preserved in both the deeper shadows and the brighter highlights.

Noise isn't an issue up to ISO 1600 and the effects only start to become noticeable at ISO 3200 as the reduction processing scheme results in an increase in graininess (although, surprisingly, the detailing remains pretty good). You can still comfortably shoot at ISO 6400 too, and even at the highest sensitivity settings the issue is mostly grain rather than significant losses of definition and saturation. Overall, the G7's low light performance is exceptional and easily on a par with that of the (pricier) Olympus OM-D E-M5 Mark II.

THE VERDICT

With things hotting up considerably in the mirrorless camera market, a mild upgrade was never going to cut it, especially in the light of MFT rival Olympus's Mark II E-M5, but Panasonic has taken a slightly different tack. So while the G7 doesn't have quite as many bells and whistles as the E-M5II, it's significantly cheaper and it does have 4K video plus the surprisingly useful '4K Photo' modes. However, the real icing on the cake is the redesigned control layout which compliments the already superior user interface and promotes exceptional efficiency.

There's no doubt Panasonic's gunning for D-SLR converts here, but the G7 is equally enjoyable to use via its touch screen controls and 'Quick Menu'. There are also big ticks for the 'DFD' autofocusing, OLED viewfinder and, again, Panasonic's ability to squeeze a big performance out of its 16 MP sensors. But affordability – or, perhaps more correctly, value for money – is the Lumix G7's trump card. Form an orderly queue please.

VITAL STATISTICS

PANASONIC LUMIX DMC-G7 $999

with Lumix G Vario 14-42mm ASPH zoom

Type: Fully automatic digital camera with Micro Four Thirds bayonet lens mount.
Focusing: Automatic 49-point wide-area system using contrast-detection via imaging sensor. Single focus point – with variable area size – can be moved around the image frame, and clusters of focus points set manually (Custom Multi). Manual and automatic switching between one-shot and continuous AF modes, the latter with auto tracking. Face detection and recognition. Sensitivity range is EV -4.0 - 18 (ISO 100). AF assist provided by built-in illuminator. Focus assist via magnified image (up to 6.0x with continuous adjustment) and focus peaking display (Green, Yellow or Blue; High or Low intensity).
Metering: 1728-point multi-zone, centre-weighted average, spot and TTL flash. Metering range is EV 0 to 18 (ISO 100/f2.0).
Exposure Modes: Continuously-variable program with shift, shutter-priority auto, aperture-priority auto, metered manual, TTL auto flash and TTL flash. Plus 24 subject/scene programs. Subject programs also set appropriate white balance, sharpening, contrast and colour saturation. Auto scene selection in 'Intelligent Auto' (iA) mode (portraits, scenery, macro, night portrait, night scenery, sunset, baby and food). Twenty subject programs available for movie shooting.
Shutter: Electronic, vertical travel, metal blades, 60-1/4000 second plus B (up to 120 seconds). Flash sync to 1/160 second. Alternative sensor shutter has a speed range of 1-1/16,000 second. Exposure compensation up to +/-5.0 EV in 1/3-stop increments.
Viewfinder: OLED-type EVF with 2.359 megadots resolution. Coverage = 100% vertical/horizontal. Magnification = 1.34x (50mm lens at infinity). Digital displays and focus point indicators. Eyepiece strength adjustment built-in. Manual or automatic switching between the EVF and external monitor screen.
Flash: Built-in pop-up unit with GN 6.2 power (ISO 100/metres) and 14mm coverage (equivalent to 28mm). External flash units connect via hotshoe. Flash compensation range of +/2.0 EV in 1/3 stop increments. Flash modes are auto, red-eye reduction, fill-in, off, slow speed sync and second curtain sync.
Additional Features: Camera settings displayed in main monitor screen, AE/AF lock, face-detection AF/AE (up to 15), auto exposure bracketing (up to seven frames and +/-3.0 EV), multi-mode self-timer (2 and 10 second delays, one or three shots), audible signals, auto power-off, wired remote triggering, 40 custom functions, silent shooting mode. Optical image stabilisation via Lumix G-series 'MEGA OIS' or 'Power OIS' zoom lenses.

DIGITAL SECTION

Sensor: 16.84 million (total) pixels Live MOS with 17.3x13.0 mm imaging area and 4:3 aspect ratio. Sensitivity equivalent to ISO 200-25,600 (extendable to ISO 100).
Focal Length Magnification: 1.97x.
Formats/Resolution: Two JPEG compression settings, RAW output (lossless compression) and RAW+JPEG capture. Three resolution settings at 4:3 aspect ratio; 4592x3448, 3232x2424 and 2272x1704 pixels. Three resolution settings at 3:2 aspect ratio; 4592x3064, 3232x2160 and 2272x1520 pixels. Three resolution settings at 16:9 aspect ratio; 4592x2584, 3840x2160 and 1920x1080 pixels. Three resolution settings at 1:1 aspect ratio; 3424x3424, 2416x2416 and 1712x1712 pixels. 24-bit RGB colour for JPEGs, 36-bit RGB colour for RAW files.
Video Recording: MP4 format (MPEG-4/H.264 AVC compression) at 3840x2160 pixels (4K), 25 fps and 16:9 aspect ratio (100 Mbps); 3840x2160 pixels (4K), 24 fps and 16:9 aspect ratio (100 Mbps); 1920x1080 pixels, 50 fps and 16:9 aspect ratio (28 Mbps); 1920x1080 pixels, 25 fps and 16:9 aspect ratio (20 Mbps); 1280x720 pixels, 25 fps and 16:9 aspect ratio (10 Mbps). AVCHD Progressive format at 1920x1080, 50 fps and 16:9 aspect ratio (28 Mbps); 1920x1080 pixels, 24 fps and 16:9 aspect ratio (24 Mbps). AVCHD format (MPEG-4/H.264 AVC compression) at 1920x1080 pixels, 50 fps (interlaced) and 16:9 aspect ratio (24 Mbps); 1920x1080 pixels, 25 fps (interlaced) and 16:9 aspect ratio (17 Mbps). Built-in stereo microphones (with adjustable sound levels) with stereo audio input. Zebra pattern generator, two 'Cinelike' gamma profiles, 4K/FHD video streaming via the HDMI connection.
Recording Media: SD, SDHC and SDXC memory cards (with UHS-I and UHS-II support).
Continuous Shooting: Unlimited JPEG/large/fine frames at up to 8.0 fps (JPEG/large/fine) or 13 RAW frames. Medium (6.0 fps) and low speed modes (2.0 fps) available. Up to 6.0 fps with continuous AF. Up to 10 fps with the sensor shutter. 'Super High Speed' mode allows for up to 40 fps at 4.0 MP resolution.
White Balance: TTL measurement. Auto mode, five presets and four custom settings. White balance compensation (amber-to-blue and/or green-to-magenta) in all presets, and white balance bracketing. Manual colour temperature setting from 2500 to 10,000 degrees Kelvin.
Interfaces: Multi-connector (USB 2.0 and NTSC/PAL composite video), HDMI micro (Type D), 3.5 mm stereo audio input.
Additional Digital Features: Built-in sensor cleaning, 7.62 cm LCD monitor (1.04 megapixels) adjustable for viewing angle (270 degrees tilt, 180 degrees swing) and with touch control, 'Touchpad' AF zone selection, '4K Photo' modes (Pre-Burst, Burst and Burst Start/Stop), electronic level display, grid guides (choice of three), digital zoom (up to 4.0x), Adobe RGB and sRGB colour spaces, long exposure noise reduction (Off, On), six 'Photo Style' presets (Standard, Vivid, Natural, Scenery, Portrait and Monochrome), one user-defined 'Photo Style', in-camera adjustment of 'Photo Style' parameters (contrast, sharpness, colour saturation and noise reduction) 22 'Creative Control' effects as shooting modes or filter settings (Expressive, Retro, Old Days, High Key, Low Key, Sepia, Monochrome, Dynamic Monochrome, Rough Monochrome, Silky Monochrome, Impressive Art, High Dynamic, Cross Process, Toy Effect, Toy Pop, Bleach Bypass, Miniature Effect, Soft Focus, Fantasy, Star Filter, One Point Colour and Sunshine), 'Defocus Control' function (with iAuto and Creative Control only), Intelligent Dynamic' processing (Off, Low, Standard, High, Auto), 'Highlight/Shadow' control (four presets, three custom settings), HDR multi-shot capture (Auto, +/-1.0 to 3.0 EV with auto align), 'Creative Panorama' modes, 'Intelligent Resolution' processing (Low, Standard, High, Extended), intervalometer (up to 9999 frames), multiple exposure facility (with overlay and auto exposure adjustment), lens corrections (Shading Compensation and Diffraction Compensation), luminance/RGB histogram displays, highlight alert, adjustable image display time, auto image rotation, slide show (with variable display times and background music), playback zoom (up to 16x), 12 or 30 thumbnail displays, capture date calendar display, image resizing and cropping, in-camera RAW-to-JPEG processing, 'Clear Retouch' tool, built-in WiFi transmitter, DPOF and PictBridge support.
Power: One 7.2 volt/1200 mAh rechargeable lithium-ion battery pack (DMW-BLC12E type).
Dimensions (WxHxD): body only = 124.9x86.2x77.4 mm.
Weight: body only = 365 grams (without battery or memory card).
Price: $899 body only. $999 with Lumix Vario G 14-42mm f3.5-5.6 ASPH Mega OIS image stabiliser zoom. $1199 for twin lens kit which adds the Lumix Vario G 45-150mm f4.0-5.6 ASPH Mega OIS zoom.
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REPORT BY PAUL BURROWS

ZEISS
LOXIA LENSES

ALPHA BETTERS

With manual focus prime lenses enjoying a sustained revival, Zeiss is capitalising on its considerable reputation here with a growing number of models for mirrorless cameras, including the Loxia duo for Sony's E mount.

While high-tech plastics and manufacturing techniques are enabling wonders to be achieved in modern lens design, there's still something hugely appealing about the classic all-metal, all-glass construction with manual focus and a proper aperture collar. Isn't there?

And, amazingly, deep into the digital era retro manual lenses are cool again. This is partially because the video pros like using old photography lenses – manual control of focusing and the diaphragm are desirable – on their D-SLRs, and partially because retro-styled camera bodies, especially in the mirrorless world, are all the fashion at the moment. For Zeiss, of course, this is the stars aligning perfectly. It, so far, only builds manual focus lenses and it has a solid reputation built on the classic Hasselblad and Contax film camera systems so all it has to do is remix a few ingredients. The truly classic ZE and ZF mount lenses have established loyal followings among Canon and Nikon D-SLR users as have the ZM lenses for M-mount rangefinder cameras. But now the mirrorless cameras are on the march, Zeiss is looking beyond the reflex. Logically, it's concentrating on the Fujifilm X mount and Sony's E mount (now promoted to full-35mm size) for which Zeiss now offers three different line-ups. The Touit models (also available for Fujifilm X) are more contemporary in their styling as is the recently-released Batis series, but the Loxia lenses are unashamedly classical, both inside and out. This means metal barrel tubes, glass elements and engraved markings.

There are currently two Loxia models – a 35mm f2.0 Biogon and a 50mm f2.0 employing the truly classical Planar symmetric optical design. Both are designed for the 'FE' version of Sony's E mount, but can also be used on the 'APS-C' format cameras with the attendant 1.5x increase in the effective focal length. However, Zeiss emphasises that these lenses have been "specifically designed" for the Sony Alpha 7 mirrorless cameras which presumably indicates some interface implications. The mounts carry a set of electrical contacts so lens information is recorded in the Exif data and, presumably, the camera's lens correction processing (for vignetting, chromatic aberrations and distortion) is available. It's also worth noting that this interface preserves the five-axis image stabilisation in the A7 II whereas all

other non-Sony lenses default to three-way correction.

Of course, Zeiss is already closely involved with Sony in the designing of the latter's own lenses (for both A and E mount), but the Loxia models are entirely 'in house', albeit manufactured in Japan.

They're both comparatively compact designs to compliment the size of the A7 bodies, but neither are light weighs and have a reassuring 'heft' which suggests the minimal use of plastics. Also evident on the outside is the precision of the engineering with both the focusing collar and aperture ring flush with the main barrel, located with clearly very fine tolerances. As we've come to expect from Zeiss, the focusing collar's movement is silky smooth… so much so that you'll find yourself constantly winding it back and forth just to enjoy the experience. Likewise, the aperture collars have nicely notchy detents – in one-third stop increments – but there's also a 'De-Click' feature which switches the movement to continuous. This is done via a small adjustment screw in the back of the lens mount and Zeiss includes a dedicated tool for the job, but should it go astray, a jeweller's micro screwdriver will work just as well. Both lenses are supplied with a bayonet-fit metal hood.

While the precision of the fit will afford some measure of protection against the intrusion of dust or moisture, the Loxia lenses aren't

THAT BOTH THE FOCUS PEAKING DISPLAY AND A MAGNIFIED IMAGE APPEAR IMMEDIATELY YOU TURN THE FOCUSING COLLAR IS ANOTHER BENEFIT OF HAVING THE ELECTRONIC LENS-TO-CAMERA INTERFACE.

ZEISS LOXIA BIOGON T* 35mm f2.0

There is, of course, a Sony-badged 35mm f2.8 prime available for the A7 cameras, but it's a very long way off what Zeiss is offering with the Loxia 35mm f2.0, particularly in terms of the build quality. The Sony lens is also distinctly 'new age' so it's an autofocus model, lacks an aperture collar and plastic is the predominant material used in its construction. There's also the new Zeiss-designed 35mm f1.4 Distagon which is obviously faster but is at least twice as bulky and weighs 630 grams.

The Loxia 35mm f2.0 has a nine-element optical design which includes one made from glass with anomalous partial dispersion characteristics, primarily to assist with the minimising of chromatic aberrations. This lens is as much about its visual characteristics as its technical performance so it's not quite flat field – at least not at apertures larger than f5.6 – and there is some brightness fall-off or vignetting when shooting wide-open. The centre-to-corner focus fall-off from field curvature is most evident when using the closer focusing distances and significantly reduces the closer you get to infinity, but in real world terms, the slight softening towards the corners of the frame is unlikely to be an issue and besides, as just noted, it's gone by f5.6. In some situations spherical aberration is noticeable in the highlights at f2.0, but it's reduced by stopping down by even just a one-third stop and completely eliminated by f2.8.

The correction for distortion is excellent and likewise for chromatic aberrations which are, subsequently, both negligible.

Beautiful contrast adds to the perception of exceptional sharpness, but there's also a creamy smoothness in the tonality which compliments the overall clarity, giving a quite distinctive look. This is partially the look of a premium-quality all-glass optical construction, but it's also about the visual characteristics achieved via a particular combination of resolution, contrast and colour balance.

The precision of the manual focusing collar allows for exceptionally fine control, but this is where the A7's focus assist facilities – particularly the focus peaking display – proved to be extremely helpful. That both the peaking display and a magnified image appear immediately you turn the focusing collar is another benefit of having the electronic lens-to-camera interface.

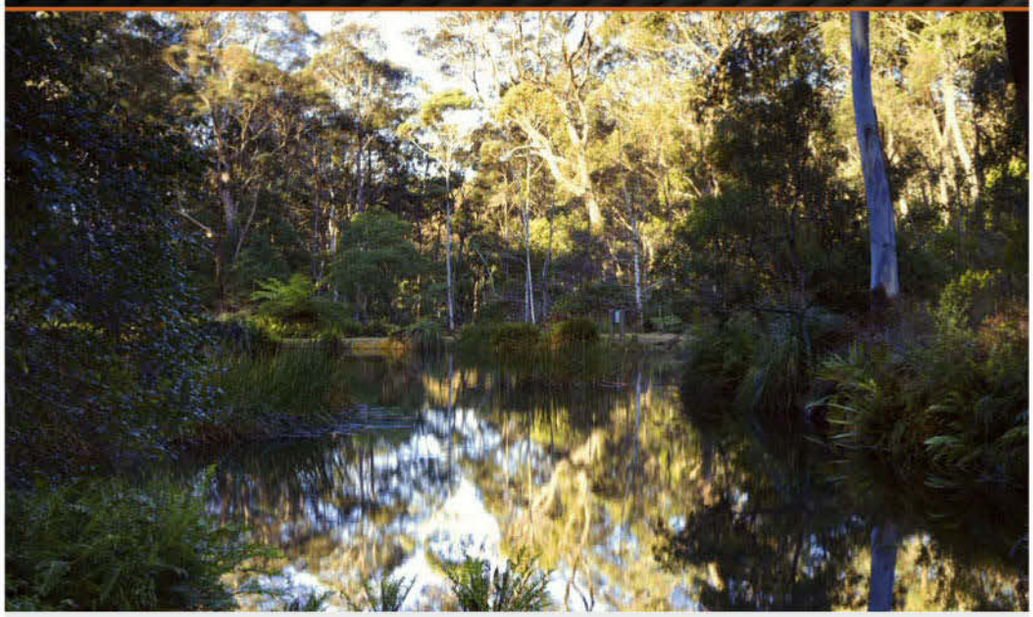
The 35mm's size and weight are also perfectly balanced for the A7 and there's a nice bit of bling where the Zeiss blue sealing gasket meets the orange Sony Alpha lens mount ring!

VITAL STATISTICS

ZEISS LOXIA BIOGON T* 35mm f2.0

Mount: Sony E (FE) mount (for full-35mm or 'APS-C' formats).
Angle-of-View: 63.02 degrees (diagonal).
Construction: 9 elements/6 groups. One element made from anomalous partial dispersion glass.
Minimum Focus: 30 cm.
Maximum Reproduction Ratio: 1:5.8.
Aperture Range: f2.0 – f22.
Overall Length: 66.0 mm.
Maximum Diameter: 62.1 mm.
Filter Diameter: 52 mm.
Weight: 340 grams.
Features: All-metal barrel construction, all-glass optical construction, depth-of-field scale, full multi-coating, ten-bladed diaphragm, 'De-Click' aperture ring, sealing ring on mount prevents the intrusion of dust or moisture. Metal lens hood supplied.
Price: $1799.
Distributor: C.R. Kennedy & Company, telephone (03) 9823 1555 or visit www.zeiss.com/photo

ZEISS LOXIA PLANAR T* 50mm f2.0



"AS WE'VE COME TO EXPECT FROM ZEISS, THE FOCUSING COLLAR'S MOVEMENT IS SILKY SMOOTH... SO MUCH SO THAT YOU'LL FIND YOURSELF CONSTANTLY WINDING IT BACK AND FORTH JUST TO ENJOY THE EXPERIENCE."

Sony's own closest prime lens offering in this category is another Zeiss-designed model, the Sonnar 55mm f1.8 which is actually quite close to the Loxia 50mm in terms of size and weight, and does have a weatherised barrel construction. Nevertheless, this is again an autofocus lens without a manual focusing collar so it doesn't have quite the same traditionalist appeal.

The Loxia 50mm f2.0 has a six-element optical construction (in four groups) and it's again very highly corrected for both distortion and chromatic aberrations to the extent that neither are ever likely to be an issue. There's slight vignetting at evident at f2.0 and f2.8, but it's completely gone by f4.0. The uniformity of sharpness across the frame is again affected by some field curvature at the larger apertures, but the centre sharpness is extremely high and the so, consequently, the fall-off towards the corners is all relative. As with the 35mm f2.0 model, stopped down to f5.6 or smaller, the Loxia 50mm delivers wonderful across-the-frame sharpness. The contrast characteristics give real depth and dynamism to the images while the colour rendition is flawless but with a pleasing saturation which creates a natural vividness.

Thanks to a ten-blade diaphragm the out-of-focus effects are nicely smooth, but the transition from sharp to soft is quite abrupt, creating a marked separation between subject and background that gives almost a 3D look. Overall then, and like its 35mm sibling, the Loxia 50mm has a distinctive visual 'personality' that gives images a real richness of character, technically speaking, but also has pleasing aspects which appeal more on an emotional level.

Also like the 35mm, the Zeiss 50mm lens works exceptionally well on the A7 body, being nicely balanced both physically and visually.

VITAL STATISTICS

ZEISS LOXIA PLANAR T* 50mm f2.0

Format: Sony E mount (for full-35mm or 'APS-C' formats).
Angle-of-View: 46.78 degrees (diagonal).
Construction: 6 elements/ 4 groups.
Minimum Focus: 45 cm.
Maximum Reproduction Ratio: 1:7.1.
Aperture Range: f2.0 – f22.
Overall Length: 120.0 mm.
Maximum Diameter: 66.2 mm.
Filter Diameter: 52 mm.
Weight: 320 grams.
Features: All-metal barrel construction, all-glass optical construction, depth-of-field scale, full multi-coating, ten-bladed diaphragm, 'De-Click' aperture ring, sealing ring on mount prevents the intrusion of dust or moisture. Metal lens hood supplied.
Price: $1249.
Distributor: C.R. Kennedy & Company, telephone (03) 9823 1555 or visit www.zeiss.com/photo

weatherproofed as such, but there is a substantial silicone gasket – in Zeiss blue – on the mounts which shields the most vulnerable area.

We tested the Loxia lenses on the original Sony A7 body which has the 24.7 megapixels sensor, but there's no doubt that the optical resolution of both models will be more than sufficient for the 43.6 megapixels now being offered on the latest A7R II.

THE VERDICT

The Zeiss Loxia lenses are arguably as much about the experience of using them as their first-class imaging performance. The manual focusing and manual aperture ring demand more involvement than the alternatives at these focal lengths, but you also still get the digital-era conveniences of an interface that enables the A7 series MF assists, accesses in-camera corrections and records the lens data (which can be useful in post-production, particularly with RAW files).

There's no question these lenses are a delight to use, but there's also real pleasure to be had from their balance of technical excellence and visual sensuality. The 35mm particularly excels in the latter while the 50mm is superior in terms of the former, being better corrected all round, but we're talking about very high standards here so both lenses deliver command performances. If you needed another reason to consider Sony's A7 cameras, the Loxia lenses present two very compelling arguments.

Voyage to awe-inspiring images.

Canon

$1199.95

BONUS
Inca Battery
Value $50

Canon Powershot G3X Advanced Compact

The Canon Powershot G3X is a powerhouse compact camera that combines a large 20.2-megapixel CMOS sensor, 25x zoom & Full HD video. The Canon made lens packs a wide aperture range of f/2.8-5.6 for operation in a range of lighting situations, while the zoom focuses from a wide angle 24mm to a super telephoto 600mm (equiv. 35mm).

20MP	25x	3.2"		5.5	
1" CMOS SENSOR	OPTICAL ZOOM	FLIP SCREEN	BUILT IN WIFI	FRAMES PER SEC	FULL HD MOVIE

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2015 FUJIFILM SHOWCASE

Sixth Round Winners

WINNER

Helen Fallow has called this image *Geometric* and it was obviously a case of being ready for the exact moment when the Gouldian Finch obliged by being perfectly framed by the entrance to the nesting box.

Bird photography requires many skills, but patience has to be near the top of the list… pictures like this just don't come along every day. Helen used a Canon EOS 7D fitted with a 300mm f2.8 telephoto lens and a 1.4x extender.

DO YOU WANT TO WIN?

Fujifilm Australia generously supplies the prizes for each issue's successful entrants to the Showcase. Entrants have the choice of specifying either film or a memory card (please specify on the entry coupon or indicate your preference if entering via email). The grand prize is a Fujifilm FinePix S4200 digital camera (or the equivalent should it be replaced in the meantime) which has a 14 megapixels CCD sensor and a 30x optical zoom equivalent to 24-720mm. Note that it is not a requirement that entries to the Fujifilm Showcase be taken on Fujifilm camera equipment, either film or digital. However, film-based photographs must be originally taken on Fujifilm products. In the case of winning images that are submitted as prints, proof may be required (i.e. by supplying the original negative).

FUJIFILM SHOWCASE 2015

TThe 2015 Fujifilm Showcase closes on 30 September 2015. Entries received after this date will be automatically entered in the 2016 competition which starts with the November/December 2015 issue. The overall winner of the 2015 competition will be announced in the same issue. You can enter the Fujifilm Showcase as many times as you like during the year, up to four photographs each time. Please make sure you provide all the necessary camera and film/capture details on the entry coupon (which can be copied if you don't want to cut up your magazine). All entries must be accompanied by a fully completed entry coupon.

Why not have a go? Not only can you win some great prizes, but it's also a chance to see one of your pictures in print. Read the accompanying rules carefully and get snapping.

HIGHLY COMMENDED

Sometimes the simplest of subjects are photographs waiting to happen… you just have to be looking. Here Paul Watson saw some potential when he spotted his nine-year-old daughter's paintbrushes sitting in a bucket of water. Some clever composition to emphasise both the shapes and colours resulted in this appealing little study. Paul used a Ricoh GXR fitted with the 24-300mm (equivalent) lens module.

COMMENDED

The low angle of the sun-light helps nicely separate this Yellow-billed Spoonbill from the background while the rippled reflections add some extra interest in the foreground, resulting in this great image of a water bird in its habitat. Regular Showcase entrant Ann Somerville-Charles used an Olympus OM-D E-M1 fitted with a M.Zuiko Digital 75-300mm telephoto zoom.

ENTRY GUIDELINES FOR DIGITAL IMAGES

You can enter digital images into the Fujifilm Showcase and files can be supplied on CD or via email to **cameracomp@avhub.com.au**. The requirements for submitting digital files are as follows...

- 300 dpi resolution, and at a file size which enables a reproduction of up to 20x15 cm. Please avoid submitting overly large file sizes, especially when emailing the images. Up to 4.0 MB in file size is more than sufficient.
- Digital retouching and manipulation is permitted, but the judges will continue to reward good camera techniques.
- The full details of the camera, lens and any retouching must be supplied with the image. Images can be titled if you wish, but this isn't essential. Please make sure your CDs or DVDs are marked with your name and address.
- Up to four images may be permitted per entry.
- Please include an SAE if you would like your CD or DVD returned.
- Prizes are now limited to SecureDigital (SD) cards and, for a limited time, 35mm film.

FUJIFILM SHOWCASE

Tell us how you did it! When you enter the Fujifilm Showcase competition, remember to explain any tips and techniques you used to achieve the result. Also, let us know the type of camera and film.

1.TITLE ____ CAMERA ____ LENS ____

2.TITLE ____ CAMERA ____ LENS ____

3.TITLE ____ CAMERA ____ LENS ____

4.TITLE ____ CAMERA ____ LENS ____

NAME ____

ADDRESS ____

STATE ____ POSTCODE ____ TELEPHONE ____

☐ Please return entries. Self-addressed postage and packaging is included.

☐ I do not want my entries returned.

Should you be successful, please nominate your prize preference (tick the appropriate box)

Preferred prize format:

☐ SecureDigital

☐ 35mm film

Post your entry to: Fujifilm Showcase, Camera Magazine, Locked Bag 5555, St Leonards, NSW 1590

DIGITAL SLR CAMERAS BUYER'S CHECK LIST SEPTEMBER/OCTOBER 2015

THIS CHECKLIST is designed to allow direct comparisons between different camera models, here listed in price order within each brand. The published prices are mostly supplied by the distributors as recommended retail prices (RRPs). However, some distributors are no longer supplying RRPs to the media so it has become necessary to determine an 'estimated street price' derived from the range of prices for a model published by retailers. Where this has been necessary, the letter 'E' appears at the start of the entry.

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				Sensor Size			Sensor Type			File Formats			Memory Cards									Exposure Modes						Features											
	Model * single lens kit ** twin lens kit	Price (Body Only Unless Noted With Asterisk*)	Megapixels (Total)	35mm	APS/DX	Four Thirds	CCD	CMOS	Foveon	RAW	TIFF	JPEG	Compact Flash	Memory Stick	SD/SDHC/SDXC * = microSD	Continuous Shooting Speed (fps)	Burst Length (U=Unlimited) Max. Resolution	Autofocus Points	Metering Zones	Program	Subject Programs	Aperture Priority	Shutter Priority	Manual	Shutter Speeds	Built-In Flash	Anti-Dust	HD Video	Mirror Lock-Up	Anti-Shake In Body	Wireless Transmitter/WiFi	Live View	Weather Proofing	Monitor Size (cm)	Weight (Body Only)	Review Issue
E	Canon EOS 1200D*	$499	18.7		•			•		•		•			•	3	100	9	63	•	•	•	•	•	30-1/4000	•	•	•	•			•		7.62	450	
E	Canon EOS 600D*	$649	19		•			•		•		•			•	3.7	u	9	63	•	•	•	•	•	30-1/4000	•	•	•	•			•		7.62	515	May/June '11
E	Canon EOS 100D*	$699	18.5		•			•		•		•			•	4	28	9	63	•	•	•	•		30-1/4000	•	•	•	•			•		7.7	370	Sept/Oct '13
E	Canon EOS 700D*	$749	18.5		•			•		•		•			•	5	22	9	63	•	•	•	•	•	30-1/4000	•	•	•	•			•	•	7.7	580	Jul/Aug '13
E	Canon EOS 750D*	$1,199	24.7		•			•		•		•	•		•	5	440	19	7560	•		•	•	•	30-1/4000		•	•	•		•	•		7.7	555	
E	Canon EOS 760D*	$1,299	24.7		•			•		•		•	•		•	5	940	19	7560	•		•	•	•	30-1/4000		•	•	•		•	•		7.7	565	
E	Canon EOS 70D*	$1,399	20.9		•			•		•		•	•		•	7	40	19	63	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	7.7	670	Nov/Dec '13
E	Canon EOS 7D	$1,799	19		•			•		•		•	•			8	90	19	63	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	7.62	820	Jan/Feb '10
E	Canon EOS 6D	$1,999	20.6	•				•		•		•			•	4.5	1250	11	63	•		•	•	•	30-1/4000		•	•	•		•	•	•	7.62	690	Mar/Apr '13
E	Canon EOS 7D Mark II	$2,199	20.9		•			•		•		•	•		•	10	U	65	252	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	7.7	910	Jan/Feb '15
E	Canon EOS 5D Mark III	$3,499	23.4	•				•		•		•	•		•	6	65	61	63	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	860	May/June '12
E	Canon EOS 5DS	$4,999	53	•				•		•		•	•		•	5	510	61	105K	•		•	•	•	30-1/8000		•	•	•			•	•	8.7	845	Sept/Oct '15
E	Canon EOS 5DSR	$5,399	53	•				•		•		•	•		•	5	510	61	105K	•		•	•	•	30-1/8000		•	•	•			•	•	8.7	845	
E	Canon EOS-1DX	$6,899	19.3	•				•		•		•	•			12	100	61	100K	•		•	•	•	30-1/8000		•	•	•		•	•	•	7.62	1340	Nov/Dec '12
E	Nikon D3200*	$549	16.9		•			•		•		•			•	4	100	11	420	•	•	•	•	•	30-1/4000	•	•	•	•	•		•		7.62	510	Jul/Aug '11
E	Nikon D5100*	$590	24.7		•			•		•		•			•	4	100	11	420	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		8.1	510	Jul/Aug '13
E	Nikon D3300*	$649	24.7		•			•		•		•			•	5	TBA	11	420	•	•	•	•	•	30-1/4000	•	•	•	•			•		7.62	410	
E	Nikon D5200*	$849	24.7		•			•		•		•			•	5	100	39	2016	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		7.62	505	Jul/Aug '13
E	Nikon D5300*	$949	24.7		•			•		•		•			•	5	100	39	2016	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		8.1	480	
E	Nikon D5500*	$1,049	24.7		•			•		•		•			•	5	100	39	2106	•	•	•	•	•	30-1/4000	•	•	•	•		•	•		8.1	420	Sept/Oct '15
E	Nikon D7000*	$1,099	16.9		•			•		•		•			•	6	100	39	2016	•	•	•	•	•	30-1/8000	•	•	•	•	•		•		7.62	690	Mar/Apr '11
E	Nikon D7100*	$1,299	24.7		•			•		•		•			•	6	33	51	2016	•	•	•	•	•	30-1/8000	•	•	•	•			•		8.1	675	Sept/Oct '13
E	Nikon D7200	$1,449	24.7		•			•		•		•			•	6	100	51	2016	•	•	•	•	•	30-1/8000	•	•	•	•		•	•	•	8.1	675	Jul/Aug '15
E	Nikon D610	$1,799	24.7	•				•		•		•			•	6	51	39	2016	•	•	•	•	•	30-1/8000	•	•	•	•			•	•	8.1	760	Mar/Apr '14
E	Nikon D750	$2,349	24.93	•				•		•		•			•	6.5	TBA	51	91K	•	•	•	•	•	30-1/4000	•	•	•	•		•	•	•	8.1	750	May/Jun '15
E	Nikon Df	$2,799	16.9	•				•		•	•	•			•	5.5	100	33	2016	•		•	•	•	30-1/4000		•		•			•	•	8.1	710	Mar/Apr '14
E	Nikon D800	$2,999	36.8	•				•		•	•	•	•		•	4	56	51	91K	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	8.1	900	Sept/Oct '12
E	Nikon D810	$3,599	37.1	•				•		•	•	•	•		•	5	100	51	91K	•		•	•	•	30-1/8000	•	•	•	•		•	•	•	8.1	880	Sept/Oct '14
E	Nikon D810A	$3,899	37.1	•				•		•	•	•	•		•	5	U	51	91K	•		•	•	•	900-1/8000	•	•	•	•		•	•	•	8.1	880	
E	Nikon D4S	$6,899	16.6	•				•		•	•	•	•			11	200	51	91K	•		•	•	•	30-1/8000		•	•	•		•	•	•	8.1	1180	Nov/Dec '14
	Nikon D3X	$9,199	25.7	•				•		•	•	•	•			5	130	51	1005	•		•	•	•	30-1/8000				•		•	•	•	7.62	1220	Mar/Apr '09
	Pentax K-S1	$749	20.42		•			•		•		•			•	5.4	20	11	77	•	•	•	•	•	30-1/6000	•	•	•	•	•		•		7.62	499	
	Pentax K-50*	$899	16.5		•			•		•		•			•	6	30	11	77	•	•	•	•	•	30-1/6000	•	•	•	•	•		•	•	7.62	590	Mar/Apr '14
	Pentax K-S2	$925	20.42		•			•		•		•			•	5.5	30	11	77	•	•	•	•		30-1/6000	•	•	•	•	•	•	•	•	7.62	618	
	Pentax K-3*	$1,599	24.7		•			•		•		•			•	8.3	60	27	86K	•		•	•	•	30-1/8000	•	•	•	•	•		•	•	7.62	715	Jul/Aug '14
	Pentax K-3 II	$1,349	24.7		•			•		•		•			•	8.3	60	27	86K	•		•	•	•	30-1/8000		•	•	•	•	•	•	•	8.1	700	
	Sony SLT-A58*	$699	20.4		•			•		•		•		•	•	5	7	15	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a	•		•	•	6.9	492	
	Sony SLT-A65*	$1,099	24.7		•			•		•		•		•	•	8	13	15	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a	•		•		7.62	622	May/June '12
	Sony ILCA-77 II	$1,499	24.7		•			•		•		•		•	•	12	60	79	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	647	
	Sony SLT-A99	$2,999	24.7	•				•		•		•		•	•	6	15	19	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•		•	•	7.62	733	Nov/Dec '12

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COMPACT SYSTEM CAMERAS BUYER'S CHECK LIST SEPTEMBER/OCTOBER 2015

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				Sensor Size			Sensor Type			File Formats			Memory Cards									Exposure Modes							Features										
	Model * single lens kit ** twin lens kit	Price (Body Only Unless Noted With Asterisk*)	Megapixels (Total)	35mm	APS/DX	Four Thirds	CCD	CMOS	Foveon	RAW	TIFF	JPEG	Compact Flash	Memory Stick	SD/SDHC/SDXC * = microSD	Continuous Shooting Speed (fps)	Burst Length (U=Unlimited) Max. Resolution	Autofocus Points	Metering Zones	Program	Subject Programs	Aperture Priority	Shutter Priority	Manual	Shutter Speeds	Built-In Flash	Anti-Dust	HD Video	Mirror Lock-Up	Anti-Shake In Body	Wireless Transmitter/WiFi	Live View	Weather Proofing	Monitor Size (cm)	Weight (Body Only)	Review Issue
E	Canon EOS M3	$799	24.7		•			•		•		•			•	4.2	1000	41	384	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•		7.5	350	
	Fujifilm X-A2	$699	16.5		•			•		•		•			•	6	18	49	256	•		•	•	•	30-1/4000	•	•	•	n/a			•		7.62	300	
	Fujifilm X-A1*	$849	16.3		•			•		•		•			•	5.6	30	49	256	•	•	•	•	•	30-1/4000	•	•	•	n/a			•		7.62	300	
	Fujifilm X-T10*	$1,299	16.7		•			•		•		•			•	8	8	49	256	•		•	•	•	30-1/4000		•	•	n/a		•	•		7.62	331	
	Fujifilm X-M1*	$1,099	16.3		•			•		•		•			•	5.6	30	49	256	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•		7.62	280	Nov/Dec '13
	Fujifilm X-T1	$1,699	16.7		•			•		•		•			•	6	47	49	256	•		•	•	•	30-1/4000		•	•	n/a			•	•	7.62	390	May/June '14
	Fujifilm X-E2*	$1,899	16.7		•			•		•		•			•	7	28	49	256	•		•	•	•	30-1/4000	•	•	•	n/a			•		7.62	300	Jan/Feb '14
	Fujifilm X-Pro1*	$2,499	16.3		•			•		•		•			•	6	18	49	256	•		•	•	•	30-1/4000	•	•	•	n/a			•		7.62	400	May/June '12
	Hasselblad Lunar*	$7,995	24.7		•			•		•		•		•	•	3	17	25	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a			•		7.62	570	
	Leica T	$2,300	16.5		•			•		•		•			•	5	12	11	TBC	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•		9.4	339	Jul/Aug '14
E	Nikon S1*	$499	12	15.9mm				•		•		•			•	15	15	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•		7.62	197	
E	Nikon J2*	$549	12	15.9mm				•		•		•			•	10	22	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•		7.62	238	
E	Nikon J3*	$599	15.1	15.9mm				•		•		•			•	15	22	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•		7.62	201	
E	Nikon J4*	$699	18.4	15.9mm				•		•		•			•	20	20	171	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a		•	•		7.62	192	
E	Nikon J5*	$749	23	15.9mm				•		•		•			•*	20	20	171	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a		•	•		7.62	231	
E	Nikon AW1*	$899	15.1	15.9mm				•		•		•			•*	15	22	135	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a			•	•	7.62	201	
E	Nikon V3*	$999	18.4	15.9mm				•		•		•			•*	20	20	171	TBC	•	•	•	•	•	30-1/16000	•	•	•	n/a		•	•		7.62	282	Sept/Oct '14
	Olympus E-PL5*	$599	17.2			•		•		•		•			•	8	16	35	324	•	•	•	•	•	60-1/4000		•	•	n/a	•		•		7.62	279	Mar/Apr '13
	Olympus E-PL7*	$799	17.2			•		•		•		•			•	8	36	81	324	•	•	•	•	•	60-1/4000		•	•	n/a	•	•	•		7.62	279	
	Olympus E-P5*	$899	17.9			•		•		•		•			•	9	17	35	324	•	•	•	•	•	60-1/4000		•	•	n/a	•		•	•	7.62	373	
	Olympus OM-D E-M10*	$999	17.2			•		•		•		•			•	8	70	81	324	•	•	•	•	•	60-1/4000	•	•	•	n/a	•	•	•	•	7.62	350	Jul/Aug '14
	Olympus OM-D E-M5 II*	$1,299	17.2			•		•		•		•			•	10	19	81	324	•	•	•	•	•	60-1/16000		•	•	n/a	•	•	•	•	7.62	417	May/June '15
	Olympus OM-D E-M1*	$1,599	17.2			•		•		•		•			•	10	49	81	324	•	•	•	•	•	60-1/8000		•	•	n/a	•	•	•	•	7.62	350	Nov/Dec '13
	Panasonic Lumix GF6*	$699	16.7			•		•		•		•			•	4.2	u	23	1028	•	•	•	•	•	60-1/4000	•	•	•	n/a			•		7.62	340	Sept/Oct '13
	Panasonic Lumix GF7*	$699	16.8			•		•		•		•			•	5.8	u	23	1728	•	•	•	•	•	60-1/16000	•	•	•	n/a		•	•		7.62	236	
	Panasonic Lumix G6*	$899	18.3			•		•		•		•			•	4.2	u	23	1728	•	•	•	•	•	60-1/4000	•	•	•	n/a		•	•	•	7.62	340	Sept/Oct '13
	Panasonic Lumix G7*	$999	18.3			•		•		•		•			•	8	u	49	1728	•	•	•	•	•	60-1/16000	•	•	•	n/a		•	•		7.62	365	Sept/Oct '15
	Panasonic Lumix GM5*	$1,099	16.8			•		•		•		•			•	5.8	u	23	1728	•	•	•	•	•	60-1/16000		•	•	n/a		•	•		7.62	211	Mar/Apr '15
	Panasonic Lumix GX7*	$1,149	16.8			•		•		•		•			•	7	u	23	1728	•	•	•	•	•	60-1/8000	•	•	•	n/a		•	•		7.62	340	Jan/Feb '14
	Panasonic Lumix GX8*	$1,499	21.7			•		•		•		•	•			10	100	49	1728	•	•	•	•	•	60-1/16,000		•	•	n/a	•	•	•	•	7.62	435	
	Panasonic Lumix GH4	$1,799	17.2			•		•		•		•			•	12	10	49	1728	•		•	•	•	60-1/8000	•	•	•	n/a		•	•	•	7.62	480	Jul/Aug '14
	Pentax Q-S1	$449	12.7	9.5mm				•		•		•			•	5	5	25	1024	•	•	•	•	•	30-1/8000	•	•	•	n/a	•	•	•		7.62	183	
	Pentax Q10*	$497	12.7	9.7mm				•		•		•			•	5	5	25	16	•	•	•	•	•	30-1/2000	•	•	•	n/a	•		•		7.62	180	
	Pentax Q*	$599	12.7	7.5mm				•		•		•			•	5	5	25	1024	•	•	•	•	•	30-1/2000	•	•	•	n/a	•		•		7.62	180	
	Pentax Q7*	$699	12.7	9.5mm				•		•		•			•	5	5	25	16	•	•	•	•	•	30-1/2000	•	•	•	n/a	•		•		7.62	180	Jan/Feb'12
	Ricoh GXR + P10*	$499	10.6	7.59mm				•		•		•			•	5	15	9	256	•	•	•	•	•	70-1/2000	•	n/a	•	n/a	•		•		7.62	367	Sept/Oct '10
	Ricoh GXR + S10*	$649	10.4	9.5mm			•			•		•			•	1.6	15	9	256	•	•	•	•	•	180-1/2000	•	n/a		n/a	•		•		7.62	325	Mar/Apr '10
	Ricoh GXR + A12*	$799	12.9		•			•		•		•			•	3	15	9	256	•	•	•	•	•	180-1/3200	•	n/a	•	n/a			•		7.62	160	Mar/Apr '10
	Ricoh GXR + A16*	$899	16.5		•			•		•		•			•	2.5	14	9	256	•	•	•	•	•	180-1/3200	•	n/a	•	n/a			•		7.62	550	May/June '12
	Samsung NX Mini*	$499	20.9	1-inch				•		•		•			•*	6	10	21	221	•	•	•	•	•	30-1/16000	•	•	•	n/a		•	•		7.62	158	
	Samsung NX3000*	$599	21.6		•			•		•		•			•*	5	10	21	221	•	•	•	•	•	30-1/4000			•	n/a		•	•		7.62	230	
	Samsung NX500	$999	30.7		•			•		•		•			•	9	40	205	221	•	•	•	•	•	30-1/16000		•	•	n/a		•	•		7.62	550	
	Samsung NX30*	$1,099	21.6		•			•		•		•			•	9	30	247	221	•	•	•	•	•	30-1/8000	•	•	•	n/a		•	•		7.62	375	
	Samsung NX1	$1,899	30.7		•			•		•		•			•	15	60	205	221	•	•	•	•	•	30-1/8000	•	•		n/a		•	•	•	7.62	550	
	Sony Alpha 3500*	$599	20.4		•			•		•		•		•	•	3.5	13	25	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a	•		•		7.62	352	May/June '14
	Sony Alpha 5000*	$699	20.4		•			•		•		•		•	•	3.5	15	25	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a		•	•		7.62	210	
	Sony Alpha 6000	$899	24.7		•			•		•		•		•	•	11	49	179	1200	•	•	•	•	•	30-1/4000	•	•	•	n/a	•	•	•		7.62	285	
	Sony Alpha 7	$1,499	24.7	•				•		•		•		•	•	5	77	25	1200	•	•	•	•	•	30-1/8000		•	•	n/a		•	•	•	7.62	416	
	Sony Alpha 7 II	$2,299	24.7	•				•		•		•		•	•	5	77	117	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	556	
	Sony Alpha 7R	$2,899	36.8	•				•		•		•		•	•	4	15	117	1200	•	•	•	•	•	30-1/8000		•	•	n/a		•	•	•	7.62	407	
	Sony Alpha 7S	$3,299	12.4	•				•		•		•		•	•	5	77	25	1200	•	•	•	•	•	30-1/8000		•	•	n/a		•	•	•	7.62	416	
	Sony Alpha 7R II	$4,499	43.6	•				•		•		•		•	•	5	30	399	1200	•	•	•	•	•	30-1/8000		•	•	n/a	•	•	•	•	7.62	582	

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